

# FLIGHT

The  
AIRCRAFT  
ENGINEER  
and  
AIRSHIPS

First Aero Weekly in the World  
Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport  
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 672 (No. 45, Vol. XIII.)

NOVEMBER 10, 1921

Weekly, Price 6d.  
Post free, 7d.

## Flight

The Aircraft Engineer and Airships

Editorial Offices: 36, GREAT QUEEN STREET, KINGSWAY, W.C.2  
Telegrams: Trudittur, Westcent, London. Telephone: Gerrard 1828

Annual Subscription Rates, Post Free:

United Kingdom .. 30s. 4d. Abroad .. 33s. 0d.\*

These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates

\* European subscriptions must be remitted in British currency

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## EDITORIAL COMMENT



THE Paris Aero Show opens on Saturday, and all the world will hear of the wonderful development of France's aeroplane industry and the enormous impetus which the cause of civil aviation has received as a result of the far-seeing policy of the French Government. In this country we have an industry which has suffered direly since the end of the War by reason of public apathy and the *non possumus* attitude of the Government towards aviation in general and particularly to the civil side of the movement. In order that the world may not be led to think that all the enterprise is centred in France, and that we in Britain have no industry left which is worthy the name, we have in this and the following issues of FLIGHT collated all the information we have been able to obtain—and we think we have secured all that is worth while—about the activities of British aircraft and aero engine manufacturing firms.

In view of the Government neglect of an essential industry and the parsimony with which it has been treated, in contradistinction to the liberality extended by the Government of France, it will doubtless come as a surprise to many to find that we actually have in active existence so large a number of firms actively engaged in aircraft construction as we are able to disclose. No doubt the surprise will be equally great when it is realised that, in spite of all the handicaps under which the aviation industry labours, Britain produces the best aero-motors and the best aeroplanes and amphibians the world can show. That this is not mere empty boasting is sufficiently demonstrated by the records which stand to the credit of British machines, equipped with British engines, and flown by British pilots. No other country can show such a record of successes in the air as ourselves. The interest is a dual one. It is satisfactory to know that we hold most of the records which are worth holding from the sporting point of view, since we hold ourselves to be the premier sporting nation. But in this case, the matter is of much greater importance than that. What it means is that the British machine and the British engine are pre-eminently the best, and that when Governments, companies, or individuals are selecting

### DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

- Nov. 10 .... Paper, "The Soaring Flight Problem," by W. L. Le Page, before R.Ae.S.
- Nov. 12-27 Paris Aero Salon
- Nov. 15-26 International Air Navigation Congress (Paris)
- Nov. 17 .... Lecture, "Requirements and Difficulties of Air Transport," by Col. F. Searle, before R.Ae.S.
- Dec. 1 .... Lecture, "The Present State of Airship Development," by Major G. H. Scott, C.B.E., A.F.C., before R.Ae.S.
- Dec. 15 .... Lecture, "Development of the Fighting Aeroplane," by Capt. F. M. Green, before R.Ae.S.
- 1922.
- Jan. 5 .... Lecture, "Specialised Aircraft," by Wing-Com. W. D. Beatty, before R.Ae.S.
- Jan. 19 .... Lecture, "Aeroplane Installation," by Brig-Gen. R. K. Bagnall-Wild, before R.Ae.S.
- Feb. 2 .... Lecture, "Radiological Research," by Dr. V. E. Pullin, before R.Ae.S.
- Feb. 16 .... Lecture, "Methods of Instruction in Aeroplane Flying," by Sq.-Leader Portal, before R.Ae.S.
- Mar. 2 .... Lecture, "Testing Aircraft to Destruction," by W. D. Douglas, before R.Ae.S.
- Mar. 30 .... Lecture, "The Design of a Commercial Aeroplane," by Capt. de Havilland, before R.Ae.S.

aero-motors or aeroplanes for their use and equipment, they must realise that by coming to us they make certain of obtaining machines which are, to quote an old commercial saying, "British and Best."

**The  
Continental  
Air Mail**

A few days ago the Postmaster-General plaintively told the House of Commons that the use made by the public of the air mail service to the Continent was very limited. Undoubtedly, this is the case and it is very unfortunate that it should be so. It is still more unfortunate that the reasons should be what they are. At the bottom of the public apathy towards the aerial mail services lies the fact that the Post Office takes little trouble to let people know that there is such a thing as an aerial postal service in being. In many large post-offices there is displayed a small, inconspicuous bill announcing in bald official language that there is an air-post to Paris and other places, and languidly informing the public that if they want to send letters that way, well, there is no particular objection and that the cost is so much and the times of posting so-and-so. Further than this there is no attempt in the world made by the Post Office to push the aerial services. Obviously, no new service of the kind can succeed unless it is properly advertised. Imagine if it were a private company which was running this aerial postal service. We should see the boardings of the country placarded with announcements of the existence of the service—as we do of the aerial passenger services to the Continent. We should see advertisements in the newspapers calling attention to the vast saving of time effected by the aerial post, and, in fact, every legitimate means would be adopted for letting the public know what was being done for the benefit of those communications which are the first requirements of business.

It is apparently not consonant with the dignity of the Post Office to advertise its activities. If it were not a monopoly it would have to advertise or go out of business. Why this attitude of shrinking modesty should be persisted in by Departments of the Government we are really at a loss to know. During the War it had to be considerably modified. When the country wanted men, the War Office advertised for them. When the Chancellor wanted money, he advertised his loans. When we desired to let the neutral countries know what was happening in the War and why we were in it, the Government spent huge sums on publicity. Finally, when we knew we had the Germans beaten we even advertised the fact among the enemy's troops and his civil population. Advertising played no small part in winning the War, yet when a great trading Department embarks upon a new scheme of commercial activity it tries its best to hide the fact. Why?

**Why  
No Air  
Stamps?**

Why does not the Post Office follow the example of other countries in which aerial postal facilities exist, and issue a series of special air post stamps? We have asked the question dozens of times, but so far have not been able to elicit a reply from the Department concerned. *The Times* has now taken up the question, quoting what we said on the matter a fortnight ago, and a question will have been asked in the House before these lines are printed. It will be interesting to hear what the Postmaster-General has to say about it. Probably that the matter is under

consideration and that something may be done later on—at about the time of the Greek kalends.

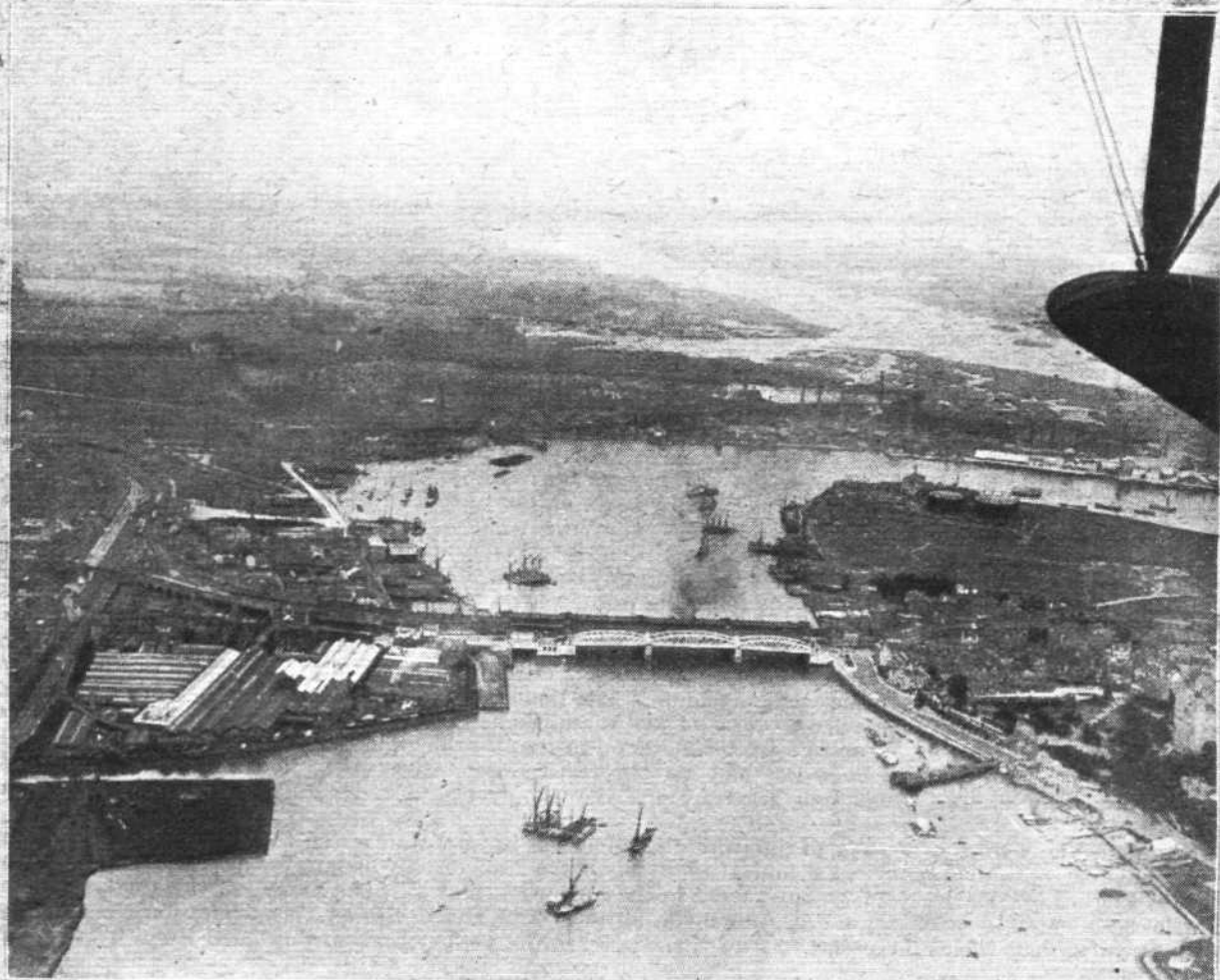
Here again is one of the vicious results of a Government monopoly of a business undertaking. A private concern would long ago have seen the necessity for such stamps as we have time and time again suggested should be put into use. They alone, as we have pointed out, would prove a very potent form of advertisement for aerial services, since every letter franked by such a special stamp would be a missionary for the services. Collectors would send letters by air-post simply for the sake of securing specimens of properly cancelled air-post stamps, and, once the individual had learnt to realise the enormous saving of time effected by this method of transmission, the habit would grow. But there is no need to elaborate the arguments. Everybody but a postal official must realise that if air-postal services are to become a real factor in business they must be steadily built upon a foundation of adequate publicity, and that among the propaganda, which is necessary to popularise them, comes first and foremost a special air-post stamp. Other countries have realised this fundamental fact, and each and all have their special issues. Why cannot we? Is the Post Office merely lethargic, or does it feel actual hostility towards aerial transport? We are really at a loss to know.

**Air Mails  
to  
Australia**

The official attitude was well illustrated recently when, in a reply to Mr. Raper, the Postmaster-General said that if a weekly air service could be established from London to Australia, he would be prepared to consider the question of employing it for the conveyance of mails. The quantity of mails available and the price to be paid for their carriage would depend on the amount of the extra fee which would have to be charged for the service and on its speed and reliability, which it would be difficult, in the present conditions, to determine beforehand. He would, he said, be glad to see something like a definite undertaking that it was possible to carry out the service. If he could receive such an undertaking, he would be glad to consider it sympathetically.

Always the open mind! The official attitude is invariably that of wanting to see a sovereign on the counter before agreeing to risk 15s. Once again, if a private enterprise were asked what its attitude would be towards a weekly mail service to Australia, the reply would be that the moment it was found to be a feasible proposition it would be supported with all the goodwill and with all the business possible. Not that if and when it was an established and entirely incontrovertible fact it would receive "sympathetic consideration"—extending over a term of years. Further, we are quite confident that if the post-office business of the country was conducted by a private company, instead of by a State Department, we should long ere this have had tenders asked for for the conveyance of mails overseas to far greater distances than are covered by the existing services, and the company would have strained every nerve to induce the public to take advantage of the facilities of the air post. The simple reason for this is that there is money to be made out of aerial postal services, if they are properly worked, properly advertised, and generally well managed. A private concern would realise that it had got to be done before someone else did it. A Government Department has no competition to fear and is content to remain in a rut.





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**LONDON-PARIS FROM THE AIR, AS SEEN FROM A HANDLEY PAGE MACHINE :**  
No. 14.—Rochester and River Medway, looking up river and down river

# MODERN BRITISH AIRCRAFT

## A *Résumé* of Machines and Engines of Today

WHILE Government encouragement, financial and other, has enabled the French aircraft industry to build on a scale which is at the moment far ahead of anything which we have to show in this country, the leeway that we shall have to make up sooner or later is quantitative rather than qualitative. France has incomparably greater distances of "airways" operating at the present time than have we with our modest 240 miles of London-Paris route. France is spending millions where we are spending thousands. France is giving encouragement where we are—shall we say "blazing the trail"? France is giving orders for scores of machines where we are ordering in twos and threes. And yet, in spite of such handicaps, we would like to affirm that, type for type, machine for machine, modern British aircraft is most certainly not behind that of France, or any other country, for that matter.

Unfortunately, the same reasons which have caused the British Aircraft industry to be content with relatively few home orders have also prevented it from being represented at the forthcoming Paris Aero Show. The fact of the matter is that there is no money available for spending on such expensive—although undoubtedly excellent—advertising as that afforded by exhibiting at the French Show. Thus British aircraft constructors are unable to prove, by actually placing their products side by side with those of France, that in quality, at any rate, they are able to hold their own. We know that they are, and a good many of the people that count all over the world know that they are, but there can be no doubt that an exhibition such as that which opens its doors on Saturday, November 12, at the Grand Palais in Paris does afford an opportunity of bringing home the relative merits in a most forcible way.

In order to assist the British Aircraft industry in placing its most modern work before the world—and not only that relatively small part of the world which will visit the Grand Palais, but the far greater proportion which has not the opportunity of visiting Paris—we have compiled in the following pages a brief *résumé* of the machines and engines at present being manufactured and sold by the British Aircraft industry. We do not propose to deal, in these articles, with the numerous minor accessories which form part and parcel of the equipment of a modern aeroplane or seaplane, for the simple reason that such accessories will be fitted as a matter of course by the makers of the various machines and engines. Thus when the firm of A. and Co. sell a machine to Argentine, that machine is fitted as standard with, generally, B.'s or C.'s engine, and with approximately the rest of the alphabet's accessories. Thus A. and Co., and to a somewhat similar extent B. and C., are the principal order-getters. If once A., B. and C. get their orders, the rest of the alphabet get their share automatically.

Finally, we might add that we have not had to resort to representatives of foreign Powers for addresses of "high authorities and most important personages abroad," for the simple reason that *FLIGHT* already carries these on its subscription lists.

With regard to the particular manner of publishing this issue, it has been suggested to us that it should be published in French. We have seen a fair amount of technical stuff translated into foreign languages, and also foreign technical stuff translated into English (of sorts). And we have come to the conclusion that as it is a matter of the greatest difficulty to get technical articles really well translated, and as, moreover, all the "high authorities and most important personages abroad" read English fluently, they would far prefer to read the articles in (let us hope) reasonably good English to reading them in frankly bad French.

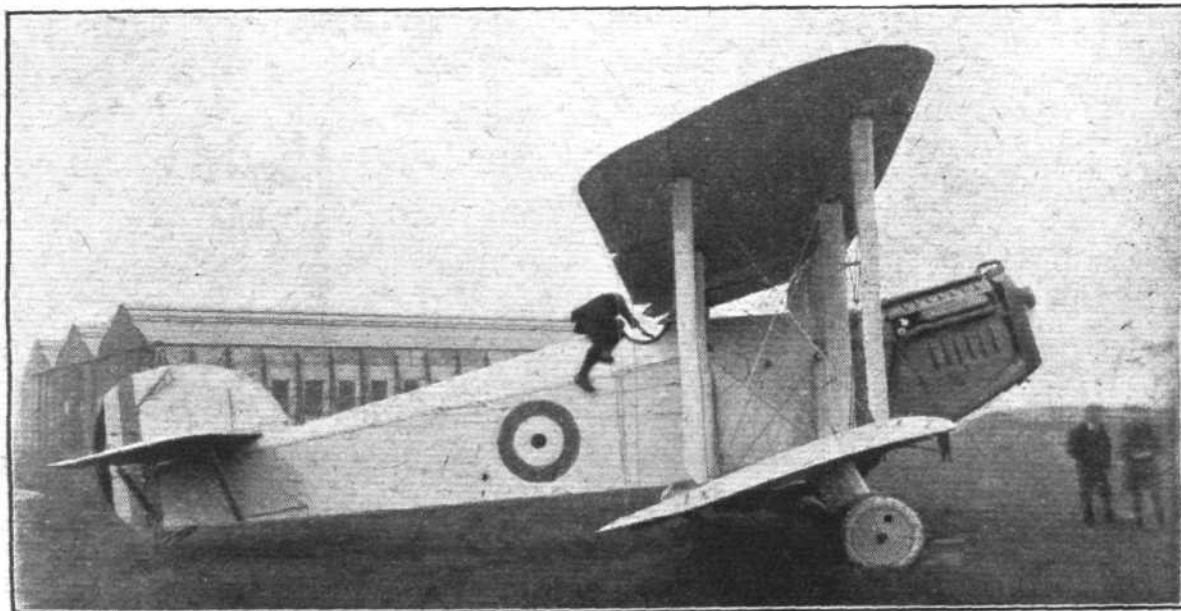
In the present number we deal with all the British firms at present engaged upon aeroplane or seaplane construction. In our next issue we shall describe all the aero engines which are being manufactured and used at the present day, and also the first instalment of our usual full report on the exhibits at the Paris Aero Show.

## THE BLACKBURN AEROPLANE AND MOTOR COMPANY, LTD.

### OLYMPIA, LEEDS.

THE earliest Blackburn aeroplane was designed, built and flown by Mr. Robert Blackburn in 1909, and it is mainly to his engineering skill and perseverance that the business which bears his name owes its present position. During the War the Blackburn firm specialised in the design of long-range seaplanes, large bombers, and, particularly, torpedo-dropping aeroplanes for use either from land or from surface vessels.

This branch of construction still forms the mainstay of Blackburn activity, and some excellent results have been obtained. As these machines are being built to the order of the British Air Ministry, comparatively little may be said regarding their detail construction. This applies more especially to the latest type, the "Swift." An older type is shown in one of the accompanying photographs in the act of



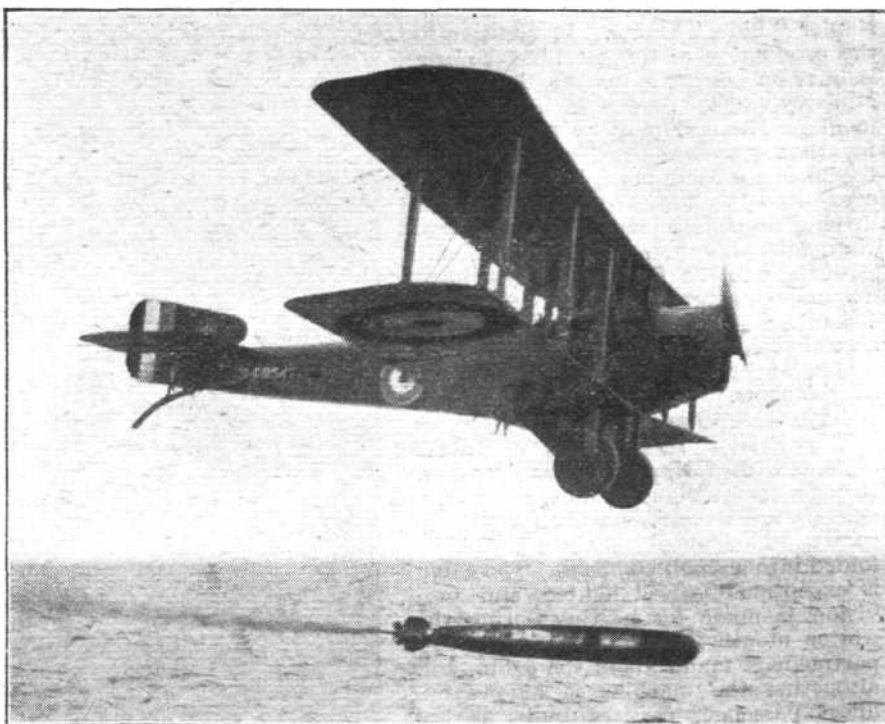
The Blackburn "Swift" torpedo-plane, fitted with a Napier "Lion."



dropping a torpedo into the sea. The next step was the "Blackburd," described in *FLIGHT*, of December 11, 1919. This machine had a Rolls-Royce "Eagle" engine, and was capable of carrying a torpedo weighing close upon 2,000 lbs. It had a maximum speed of 92 m.p.h.

The "Swift," also a torpedo-plane, is fitted with a Napier "Lion," and was exhibited at the last Olympia Aero Show, *minus* some of the special equipment, notably that of the torpedo gear. This machine is also illustrated herewith. As there are many restrictions on a machine which is to be used for launching from the deck of a ship, while carrying a heavy torpedo weighing some 1,500 lbs. with the addition of a lot of extra gear in connection with the dropping, heating, etc., of the torpedo, the machine is of somewhat unusual appearance, caused chiefly by the fact that dimensions are limited by space on board ship, and that the pilot's view must be as unrestricted as possible so as to enable him to land on the deck of a ship. The "Swift" has a maximum speed of over 100 m.p.h., and lands at about 45 m.p.h.

From a constructional point of view, the "Swift" is interesting on account of the fact that the entire centre-section has been built of steel tubing, with fittings machined from solid steel, while the engine mounting, undercarriage struts, main spars and fuselage longons join directly on to these fittings.



An early type Blackburn torpedo-plane, releasing its load.

## BOULTON AND PAUL, LTD. NORWICH.

BOULTON AND PAUL, LTD., of Norwich, came into the aviation industry during the War. At first they built machines under licence, but after a time they decided to establish a designing department. Mr. J. D. North was put in charge, and several interesting machines have since then been built by this firm. An excellent research department was established, and the firm now has its own wind tunnel and a well-fitted-up laboratory, in which research work is being carried on. Among the best-known of the Boulton and Paul machines is the "Bourges," a twin-engined bomber, the first of which were fitted with 320 h.p. A.B.C. "Dragonfly" engines. Later models have been fitted with two Napier "Lion" engines.

At the Paris Aero Show of 1919 Boulton and Paul exhibited a small biplane, with a 100 h.p. Bristol "Lucifer" radial air-cooled engine. This machine was built entirely of metal, and had its fuselage covered with a fireproof fibre sheeting.

During the last two years this firm has devoted its attention almost exclusively to research and experiment with metal construction. As, however, this work is being carried out for the Air Ministry, we are not at liberty to refer to it in detail. Suffice it to mention that, although such work is necessarily costly and takes considerable time, good progress is being made, and the day does not appear far distant when the metal aeroplane can be produced as cheaply as and probably more rapidly than the wood structure machine.

## THE BRISTOL AEROPLANE COMPANY, LTD. FILTON, BRISTOL.

ORIGINALLY known as the British and Colonial Aeroplane Company, this firm was founded by the late Sir George White in 1909, and has occupied a prominent position in the British Aircraft Industry ever since. Originally the firm started with French designs built under licence, but the Bristol machines

are now entirely British design and construction. We have not here the space to refer to the large number of types produced at Filton, but must confine ourselves to a brief reference to one of the latest commercial machines, the Bristol 10-seater (8 passengers in cabin, pilot and engineer outside),



The Bristol 10-seater commercial biplane, fitted with a Napier "Lion."

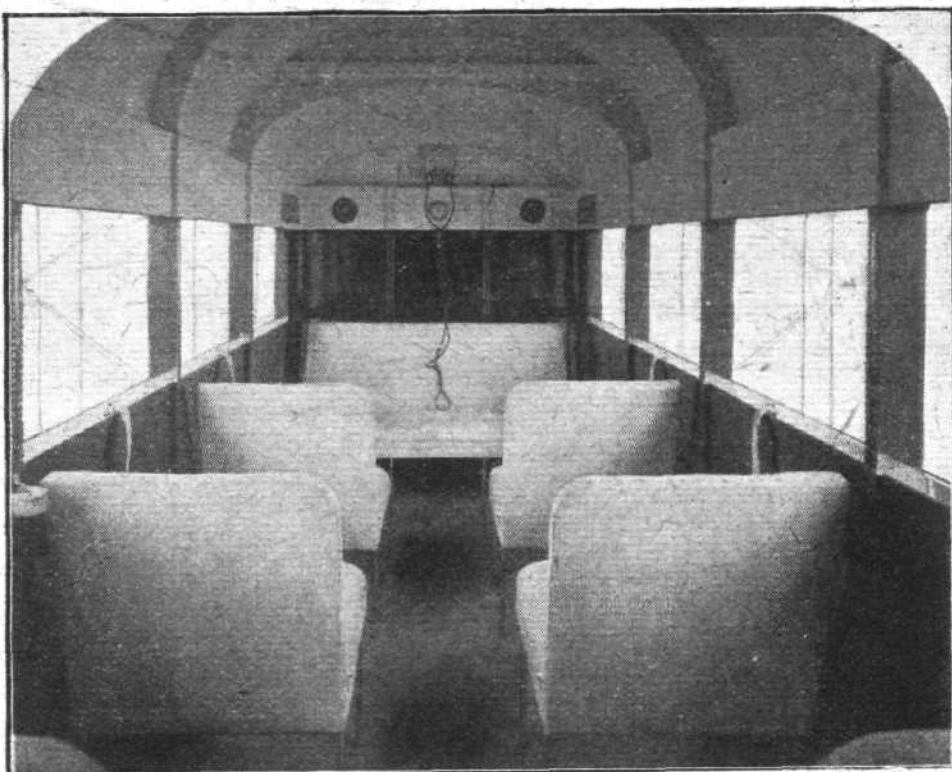
Napier "Lion" engine. In addition to the production of this machine the firm is busy on contracts for the British Air Ministry and for several foreign governments. Mention may be made of the fact that at present some very interesting triplanes are being built, incorporating a central engine house with four engines driving propellers placed on the wings. No details may, however, be published.

Visitors to the Paris Salon will have an opportunity of seeing one of the Bristol products, the 450 h.p. "Jupiter" aero engine, which will, so far as we are aware, be the only British representative at the show. Of this engine we hope to have more to say in our next issue.

The Bristol 10-seater is a tractor biplane with a Napier "Lion" engine. It has a commodious cabin seating eight passengers in comfortably upholstered chairs, so arranged that they can be folded into a small compass. The cabin is exceptionally well lighted, and provision is made for heating during the winter months. A large luggage compartment is found aft of the cabin, and altogether the machine is among the finest passenger carriers built at the present time. When the air lines get busy next spring, a number of Bristols will be put on the London-Paris "airway," when they will be given an opportunity of demonstrating their value in practice. It might be mentioned incidentally that the 10-seater has been designed by Mr. W. T. Reid, who has succeeded Captain Barnwell as chief designer to the Bristol Aeroplane Co.

If it is desired to use the machine as a cargo carrier, the cabin space available is 10 ft. 6 ins. x 5 ft. 9 ins. x 4 ft. 6 ins. When fitted up as a passenger machine, the paying load carried is eight passengers, equivalent to a load of 1,280 lbs. plus 400 lbs. of luggage. As a cargo machine the load avail-

able for freight, mails, etc., is slightly over 2,000 lbs., so that the machine should work out very economically for either purpose. The transformation from one type to another is rapidly carried out. We understand that the machine is very stable and comfortable to fly, so that it should become popular when commercial activities are resumed on a larger scale in the spring. The machine was described in detail in our issue of July 7, 1921.



An interior view of the cabin of the Bristol 10-seater biplane.

## THE CENTRAL AIRCRAFT COMPANY.

PALMERSTON WORKS, 179, HIGH ROAD, KILBURN, LONDON, N.W. 6.

The Central Aircraft Co. came into being during the War, at first building machines and making parts under licence.

Later they took up original design, obtaining the services of Mr. A. A. Fletcher as chief designer. Among the machines



Three Central Aircraft machines. At the top (left) the "Centaur" 4 school biplane (100 h.p. Anzani), and, on the right, the "Centaur" 4B, three-seater seaplane, a modification of the former type. Below is the "Centaur" 2A, 320 h.p. (two 160 h.p. Beardmores), eight-seater commercial biplane.



now being manufactured by them mention may be made of the twin-engined passenger machine "Centaur 2A," a biplane with cabin accommodation for six passengers inside and one passenger next to the pilot. The engines fitted are 160 h.p. Beardmores, so that the power expenditure is just under 46 h.p. per passenger carried. The machine is therefore extremely economical to run, and has quite a good performance for its power loading, i.e. a top speed of about 90 m.p.h. for a power-loading of over 20 lbs. h.p. If used as a goods carrier, the machine carries approximately a ton of goods or mails.

In addition to the "Centaur 2A," the Central Aircraft Co. manufactures several types of smaller, single-engined machines. For instance, the "Centaur 4," a training biplane with 100 h.p. Anzani engine, is a low-priced machine especially suitable for school work.

The "Centaur 4A" is similar to the "Centaur 4" except that dual control is not fitted, while there is an extra seat in the fuselage. This machine is very suitable for "joy-riding," as it is economical to run and carries two passengers per trip.

A further development is the "Centaur 4B," which is a development of the machine previously mentioned. It is fitted with twin floats instead of the usual land undercarriage, and in spite of its relatively low power, it gets off the sea with three on board quite easily. The whole flotation gear is quickly detachable, when the land undercarriage can be substituted in a few minutes. As the weight of the floats is somewhat greater than that of the wheels, the performance is not quite so good, but the maximum speed as a seaplane is about 75 m.p.h., while as a land machine 80 m.p.h. represents the maximum speed.

## DE HAVILLAND AIRCRAFT COMPANY, LTD.

STAG LANE AERODROME, EDGWARE, MIDDLESEX.

SINCE establishing his own firm at Edgware, Capt. de Havilland has produced several types of machines, of which reference will only be made here to three commercial types.

Designed originally as an experimental machine for the British Air Ministry, the De Havilland monoplane, type 29, in its second edition is a commercial design of the greatest promise. The machine, which was very fully described in

a Napier "Lion," is so mounted in the nose of the machine that it can be detached as a complete unit by undoing the four corner bolts and disconnecting the petrol pipes. The under-carriage is of the oleo type. The monoplane combines high performance with good economy in running, and should become very popular on the airways next year.

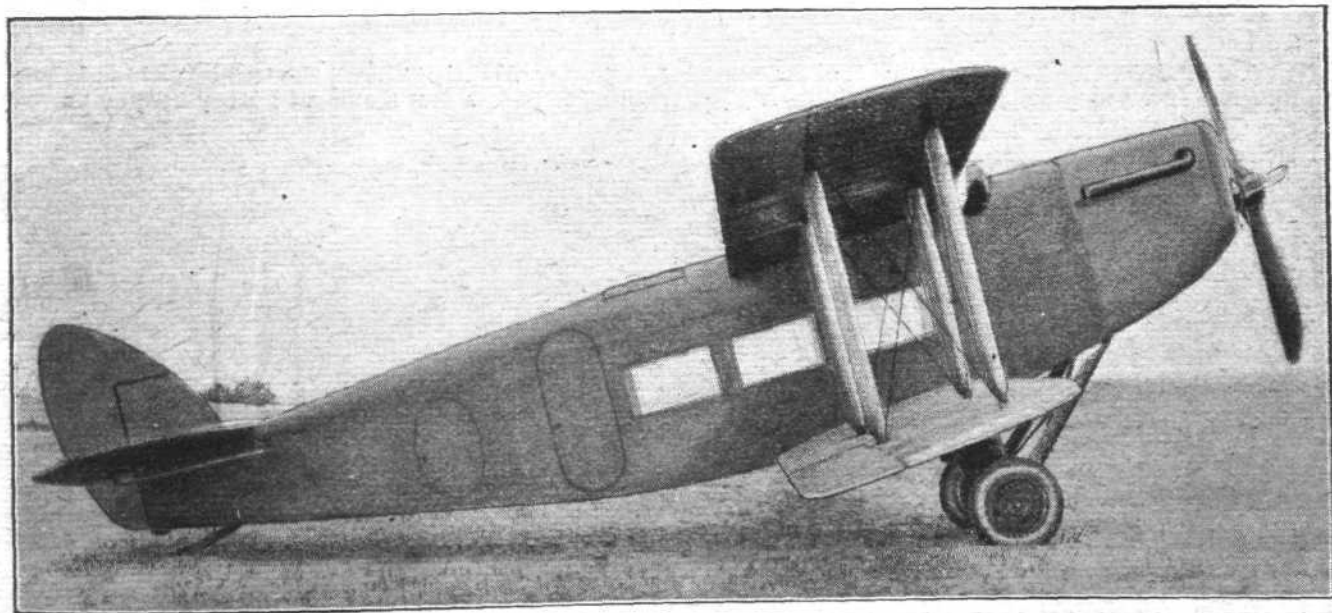
The D.H.32 is a biplane designed for services on which the



The De Havilland "29" commercial monoplane, a 12-seater fitted with a Napier "Lion."

FLIGHT of September 29 last, is a tractor, with monoplane wings of the cantilever type without external bracing. The cabin has seating accommodation for 10 passengers, who obtain an excellent view owing to the position of the wing above the roof of the cabin. The pilot is seated in front of the leading edge of the wing, and next to him is a seat for the navigator or engineer, as the case may be. The engine,

demand is for economy, and where high performance is not so essential, although the speed is still quite good. This machine is fitted with a Rolls-Royce "Eagle" engine (low compression), so that with the full load of eight passengers, the power expenditure at full power is only about 40 h.p./passenger. At cruising speed and approximately two-thirds power the economy is, of course, better still, so that it



The De Havilland "32" commercial biplane, 360 h.p. Rolls-Royce.

will be seen that in the D.H.32 we have a very economical machine. The cruising speed is about 98 m.p.h., with a maximum speed of 110 m.p.h. The range is four hours at cruising speed, or approximately 400 miles. As a cargo machine the capacity is 1,536 lbs. in a space of 288 cu. ft.

For carrying slightly greater loads at a somewhat higher speed, the De Havilland Aircraft Co. have designed the D.H.34, which is a biplane very similar in general arrangement to the 32 but with a Napier "Lion" engine. The passenger accommodation is for ten, nine in the cabin and one

by the side of the pilot. When the machine is used for carrying goods the capacity is approximately 2,000 lbs. It is of interest to note that the structural weight of this machine is small. Empty, but with cooling water, the weight is 3,365 lbs., and fully loaded the machine weighs 6,218 lbs. Sufficient fuel is carried for a duration of three and a half hours at a cruising speed of 105 m.p.h., or a range of about 370 miles.

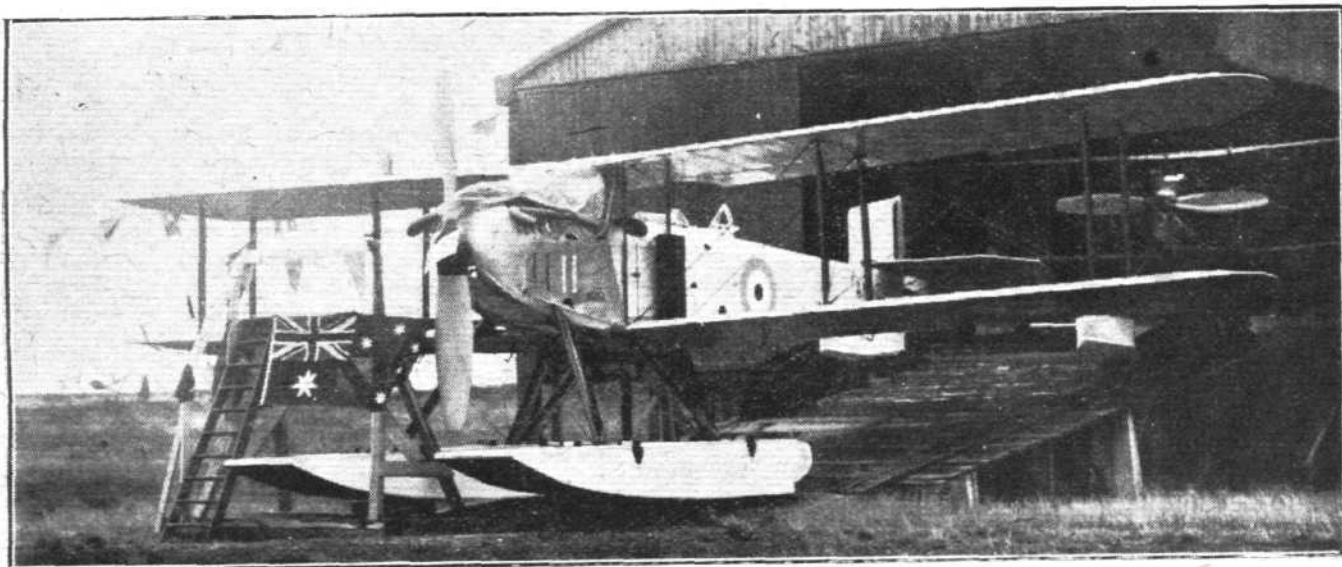
We understand that several of these machines have already been ordered.

## THE FAIREY AVIATION COMPANY, LTD.

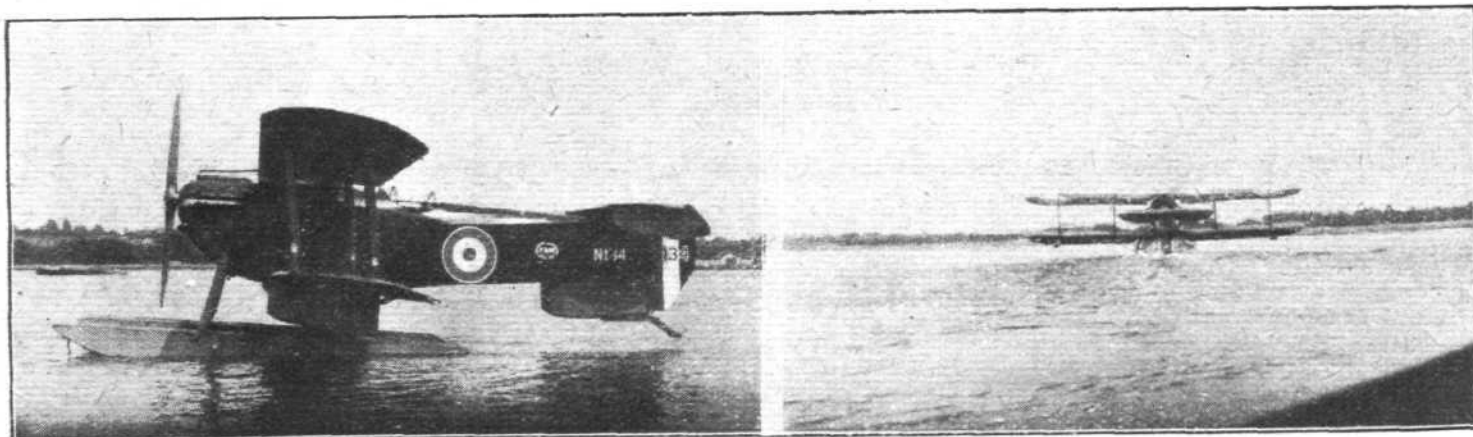
HAYES, MIDDLESEX.

THE Fairey Aviation Co., Ltd., has specialised on the design and construction of seaplanes, of which a number of different

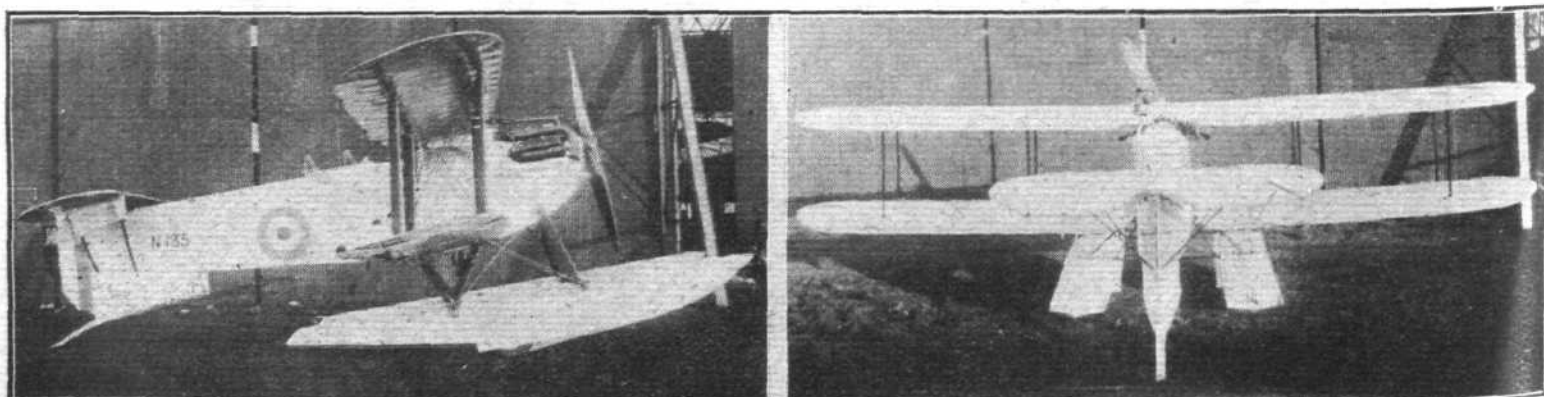
types have been produced. Best known is, perhaps, the type III, with its variations A, B, C, and D. A very full description



The Fairey IIID Seaplane.



A FAIREY AMPHIBIAN: The photograph of the machine just after alighting shows the trailing edge of the wings pulled down to give greater lift. This hinged trailing edge is a feature of all Fairey seaplanes.



TWO VIEWS OF THE FAIREY "PINTAIL": This machine is an amphibian with Napier "Lion" engine.



of the IID appeared in our issue of August 18, 1921. This machine is a single-engined twin-float seaplane, with a Rolls-Royce "Eagle" engine. It has been extensively used by the R.A.F., and several have been built for Australia. One of the features of this, as of all other Fairey seaplanes, is the variable camber gear, for which Mr. Fairey holds a patent. The operation of the gear is simplicity itself, and merely consists in an arrangement, worked by cables, for pulling down the entire trailing edge of the wings to increase the camber and thus the lift. The whole trailing edge is hinged, but the outer portion is separate from the rest, and, while moving up or down with the rest of the flap, retains its differential *aileron* movement. The flap has been found very effective in practice, and its use allows of a considerably higher wing loading without increase in the landing speed.

Apart from the well-known type IID, the Fairey Aviation

Co. have built several other interesting types, of which, however, nothing may be said. The accompanying photographs show two versions of the Fairey amphibian known as the "Pintail." The general arrangement of these machines can be seen from the photos., but details are taboo.

We might mention, however, that the Fairey Co. is now taking up building of land machines, and has on order two special types for the British Air Ministry. The Company also has in hand considerable experimental work in connection with metal construction of machines, including floats and improved forms of boat-building and other methods of construction calculated to make their products more seaworthy and durable. Other new designs are in hand, and the company has recently greatly enlarged its technical staff, so that altogether the Fairey Aviation Co. is doing very well indeed, considering the present state of all industries.

## THE GLOUCESTERSHIRE AIRCRAFT COMPANY, LTD.

SUNNINGEND WORKS, CHELTENHAM, GLOS.

The Gloucestershire Aircraft Co., Ltd., is one of the firms who, having come into the aviation industry during the War, have become convinced of the great future which awaits aviation. They consequently engaged Mr. H. P. Folland, who had hitherto been chief designer to the British Nieuport Company, and previous to that had been a designer at the Royal Aircraft Establishment at Farnborough, as their Chief Engineer and Designer. As is now well known, Mr. Folland's first task was the designing and construction of the "Mars I" Napier "Lion." This machine was designed and constructed in one month, and won the Aerial Derby of 1921, as well as establishing two world's records, one for a closed circuit, and one for greatest speed over a 200-mile course. As further proof of the initiative of this firm, it may be recalled that it was the only British firm to enter a machine for the Deutsch Cup at Etampes. We believe that the machine is now going to Martlesham to be given its official speed tests, and there is scarcely room for doubt that a new British speed record will then be established.

In addition to the "Mars I" this firm makes three other types of machines, the "Mars II," "Mars III," and "Mars IV." These are developments of the famous Nieuport "Nighthawk," also designed by Mr. Folland. All three

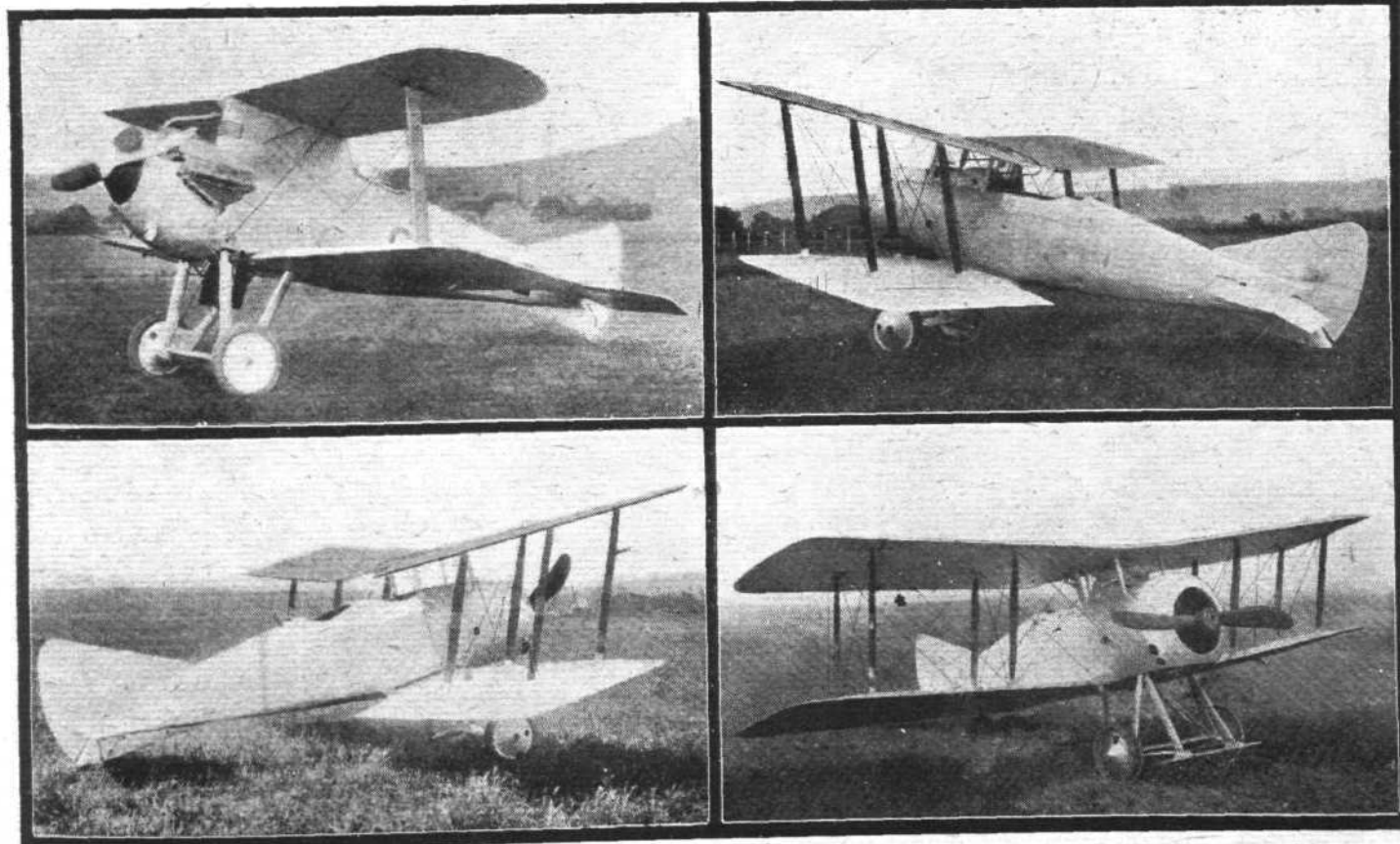
machines are fitted with B.R.2 rotary engines, instead of the A.B.C. "Dragonfly" of the "Nighthawk." The accompanying illustrations show the three types which are very similar in general arrangement. The main difference is found in the "Mars IV," which is designed as a ship's plane, and fitted with hydrovanes, to prevent it turning over on alighting in the sea.

The "Mars II" is a fast single-seater fighting scout with great manoeuvrability. The speed is 127 m.p.h. at ground level, 121 m.p.h. at 10,000 ft., and 110 m.p.h. at 15,000 ft.; climb to 15,000 ft. in 21 minutes; ceiling 19,000 ft.; range 300 miles.

"Mars III" is a two-seater dual-control training machine, and has approximately the same performance as the "Mars II."

As already mentioned, the "Mars IV" is a ship's plane. Air bags in the *fuselage* give sufficient buoyancy to float the machine. The performance of the "Mars IV" is only very slightly inferior to that of the "II" and "III," the maximum speed being 125 m.p.h. at ground level, 119 at 10,000 ft., and 105 at 15,000 ft. The ceiling is the same, and the climb to 15,000 ft. occupies 25 minutes.

In addition to the machines mentioned, Mr. Folland is busy on the design of machines to Air Ministry specifications.



Four types of the Gloucestershire Aircraft Co.'s products. Reading from left to right: Top, the "Mars I" (450 Napier "Lion") racer and the "Mars II" (230 B.R.2) fighting scout; bottom, the "Mars III" (230 B.R.2) training machine and the "Mars IV" (230 B.R.2) fighting scout, ship's plane.

## HANDASYDE, LTD.

CARLTON HOUSE, 11D, REGENT STREET, LONDON, S.W. 1.

WHEN, a short time ago, Mr. G. H. Handasyde severed his connection with the Martinsyde firm of Woking, of which he had been a partner and technical director for a great number of years, he founded a new firm under the name of the Handasyde Aircraft Co., Ltd. The new firm had offices at 11D, Regent Street, but these now appear to have been vacated. We have failed to discover that the new firm has a London office at present, and letters to Mr. Handasyde's private address have remained unanswered. It is, therefore, to be assumed that, at the moment at any rate, this famous designer is not engaged upon actual construction. He is, however, known to have got out the designs for a commercial monoplane of the cantilever type, which is said to incorporate several

novel features, such as a wing covered with wood planking, and composed internally of several spars. The undercarriage is unusual in having its points of attachment on the wings instead of direct to the fuselage. This has, presumably, been done in order to get a wider wheel track. The calculated performance is stated to be very good, and for the sake of the part which Mr. Handasyde has played in the past history of aviation, having designed some of the prettiest aeroplanes ever built, it is to be hoped that he will soon be actively engaged upon the construction of the several highly interesting machines which he is rumoured to be contemplating in the solitude of his Surrey home. The services of a designer of such qualifications should not be lost to the industry.

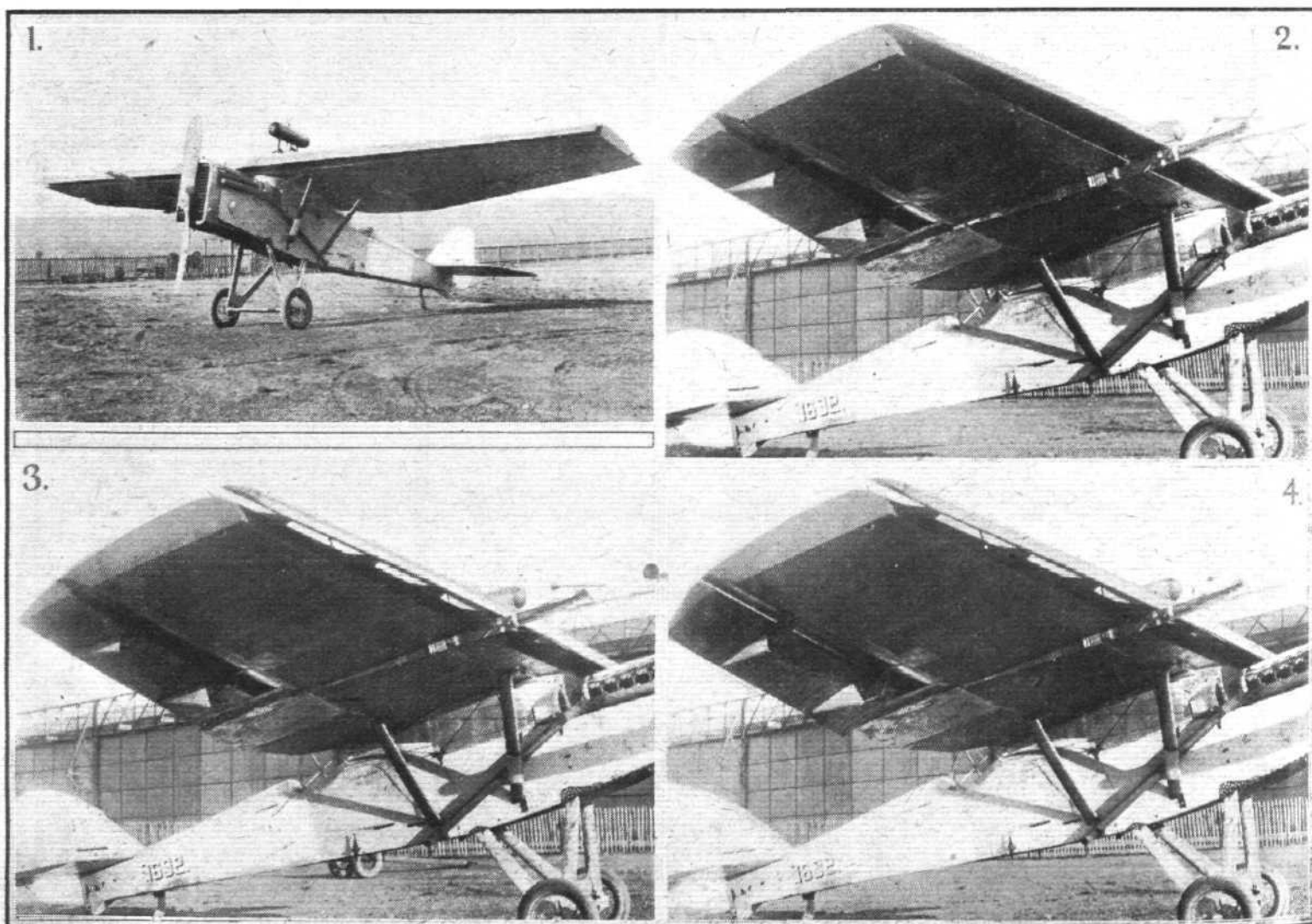
## HANDLEY PAGE, LTD.

CRICKLEWOOD, LONDON, N.W. 2.

THE firm of Handley Page is so well known all over the world that any introduction is superfluous. In addition to running the London-Paris air service, the firm is busy on constructional and, especially, research work. The branch of the latter which is at the moment receiving most attention is investigation into the possibilities of slotted aerofoils. It is now two years since these investigations were commenced, and during that time the Handley Page research department has been busy obtaining data and striving after improvements. That these have been attained will be shown presently when we come to give figures relating to one or two of the Handley Page slotted aerofoils. In the meantime a few words about the difficulties of discovering the "best" slotted aerofoil may be of interest.

Quite early in the investigations carried out in the Handley Page wind tunnel it was discovered that a multiplicity of slots gave higher lift coefficients than a single slot. As, however, the constructional problems of a multi-slot wing are extraordinarily difficult, Mr. Handley Page decided to

proceed with single-slot sections first, so as to discover if it should be possible so to improve these that multi-slot sections could be dispensed with for the time being. It was then discovered that much depended upon the shape of the slot, but other features also proved important. For instance, the size of slot—or, in other words, the amount of air that was allowed to pass through the slot—greatly affected the result. Furthermore, it was found that the angle of the slot was of importance. It will easily be understood that where there are so many variables, and there are others not mentioned here, much research work must be done before the general laws of slotted aerofoils can be established. When one remembers the differences in characteristics of ordinary aerofoils, it will be realised that to evolve the best possible slotted wing is a task of great magnitude. It is of the very greatest interest to mention, however, that one thing does appear to have been definitely established, *i.e.* that the percentage increase in lift obtained by slotting an aerofoil is approximately the same for high-lift sections as for the



The Handley Page experimental monoplane.





**THE HANDLEY PAGE W8.**—Our photograph shows this machine, which has two Napier "Lion" engines, starting off for its first flight to Paris, which was made in two hours five minutes.

thinner sections which formed the subject of the earlier experiments. Lift coefficients of well over one (absolute) have already been obtained, and work is progressing on so shaping the slots and sections that the high-lift coefficients occur at reasonably low angles. (A maximum-lift coefficient, even if of great magnitude, is of comparatively small practical value if it occurs at an angle of 30 or 40 degrees.) A considerable amount of success has already attended these experiments.

The accompanying photographs show a Handley Page slotted wing mounted on the fuselage of a D.H.9A. The machine is comparatively crudely made, but it has served to demonstrate that the scale effect is normal for a slotted wing, and also that the slotted ailerons fitted are effective up to the angle of maximum lift. A more refined machine is now being built, and the full-scale experiments will then be continued with the latest forms of slots.

To show the manner in which improvements have been effected in the results of tests on the wing with which the machine shown in the illustrations is fitted, we will give the data of the section used. This is the "Propeller section No. 4" from Reports and Memoranda No. 322. The data for the solid section are as follows:—

Angle	-4	-2	0	2	4	6	8	10	12	
$K_y$	..	.089	.163	.234	.308	.384	.453	.518	.583	.643
Angle	14	16	18	20	22	24	26	28	—	
$K_y$	..	.700	.746	.774	.774	.434	.425	.510	—	—

For the section used on the machine, which is "airscrew 4" with one slot, the values of the lift coefficient are as follows:

Angle	-4	-2	0	2	4	6	8	10	12
$K_y$	..0245	.0866	.158	.187	.194	.268	.398	.485	.575
Angle	14	16	18	20	22	24	26	28	30
$K_y$	..66	.737	.790	.836	.885	.94	1.01	1.03	1.02

These figures relate, of course, to the section with the slot open. When the slot is closed the figures are practically the same as those for the standard solid "airscrew No. 4."

By continued experiments, and with a differently shaped slot, but with the slotted aileron set permanently at an angle of 23 degrees, the same original section, i.e. "airscrew 4," gave the following results:—

Angle	-4	-2	0	2	4	6	8	10	12	
$K_y$	..	.308	.417	.428	.496	.586	.667	.715	.796	.872
Angle	14	16	18	20	22	24	26	28	30	
$K_y$	..	.978	1.033	.991	1.101	1.255	.978	—	—	—

One result of the further experiments is, it will be seen, that the lift coefficient of 1.03 occurs at 16 degrees instead of at 28 degrees as in the older section with which the machine is actually fitted. This is, in itself, an improvement of the greatest practical value, as it allows the machine to be landed at the angle of maximum lift without having to get the tail down to a dangerous extent. We should like to go further into the matter, but space does not allow of doing so here. We hope, however, to return to the subject in a subsequent issue.

## MARTINSYDE, LTD.

WOKING, SURREY.

The firm of Martinsyde, Ltd., dates back to the very early days, when the title had not yet been contracted into Martinsyde, but was Martin-Handasyde. The first efforts of the

firm were all monoplanes of extremely pleasing appearance. It was quite a number of years before Mr. Handasyde could be persuaded to design biplanes. When he ultimately did he



The Martinsyde F.4a (300 h.p. Hispano) two-seater biplane.

produced some very fine biplanes, showing that he was well capable of producing this type. He never lost faith in the monoplane, however, and, as recorded elsewhere, has returned to this type of machine after leaving the Martinsyde firm at Woking.

The various types of machines produced by Martinsydes have already been described in FLIGHT. One of the most famous is, perhaps, the F.4 with its variations. Of extremely pleasing appearance, the F.4 has an excellent performance, and was destined to play an important part in the War. It was altered in various ways after the War, such as fitting floats instead of wheels, putting an enclosed cabin on it, and so on.

Machines of this type have done excellent work in Canada, where a great deal of surveying and photographic work has

been carried out. Several machines have been sold to foreign Governments, notably the Spanish, where, we understand, the F.4 is very much liked.

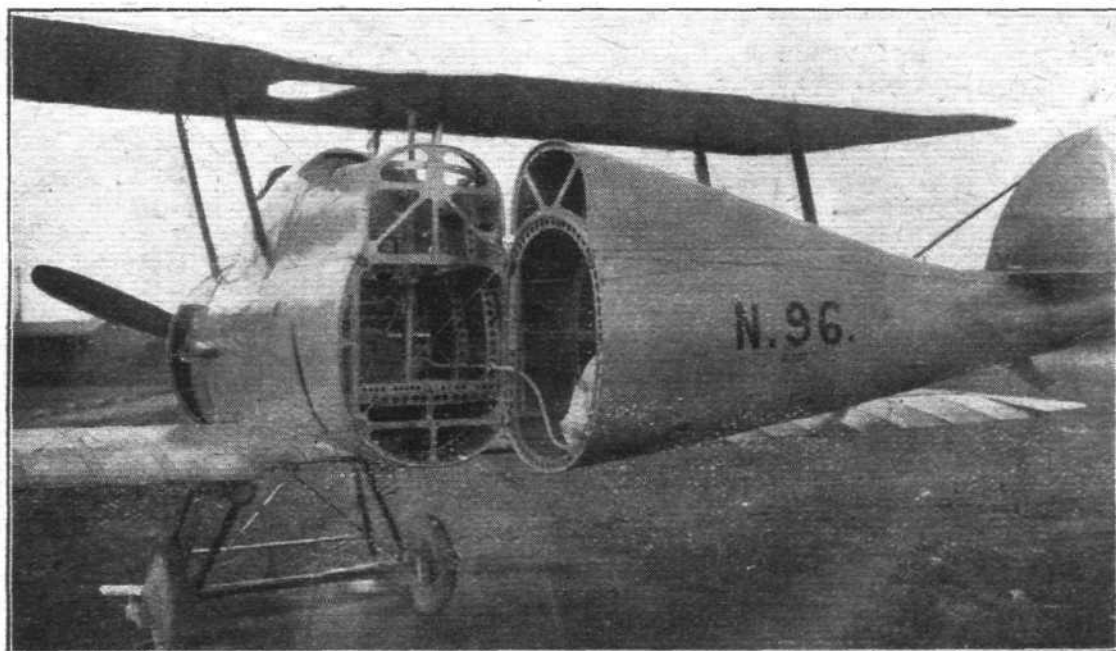
At the present moment the firm is not, we believe, doing very much in the way of aircraft construction, devoting their energies more to the Martinsyde motor-cycle, which is rapidly establishing a reputation. It is not, however, intended to drop aircraft work altogether, we believe, and Mr. Tilghman-Richards, late of Beardmore's aviation department, is now general manager of Martinsydes, and he has, at any rate, a firm belief in the future of aviation, and intends to keep the name of Martinsyde well to the fore in the future, although some time may elapse before any concrete examples of new design take the air.

GEORGE PARNALL AND CO.

COLISEUM WORKS, PARK ROW, BRISTOL.

THE first original design to be got out by this firm was the Parnall "Panther," a ship's plane designed for getting off the deck of a ship, and fitted with hydrovanes for coming

wings. This was an attempt to improve upon the more usual method of folding the wings for storage on board ship. The hinge was on the starboard side of the *fuselage*, and the

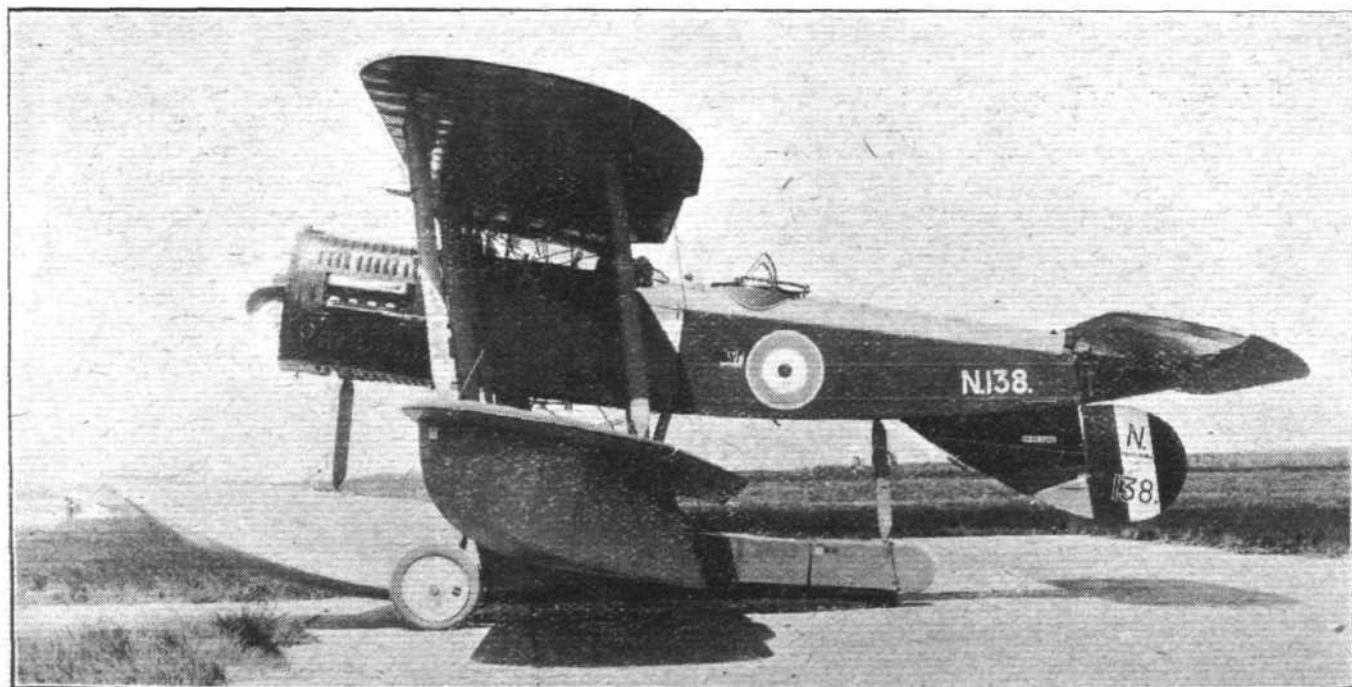


The Parnall  
'Panther'  
ship's 'plane:  
This machine is  
unusual in having  
a folding *fuselage*  
instead of the  
more usual fold-  
ing wings.

down in the sea in the lee of the ship. This machine had a number of interesting features and was of rather unorthodox design. The *fuselage* was of monocoque construction, and was so designed as to fold sideways alongside the starboard

rudder and elevator controls were so arranged that folding the *fuselage* did not interfere with them.

The latest Parnall machine to be tested is the "Puffin," a deck-landing amphibian seaplane which, like the "Panther,"



The Parnall "Puffin" deck-landing Amphibian (Napier "Lion").



shows a number of unorthodox features. For instance, it will be seen that the machine is of the single central float type, a type which has not been in general use for years. For amphibian machines, however, the designer, Mr. H. Bolas, is of the opinion that the single float possesses advantages over the twin-float type in making it easier to incorporate a land undercarriage. In the "Puffin," the lifting portion of the land gear works in a slot in the main float, the step of which continues across the bottom of the float,

so as to maintain its strength. At the rear end there is a short hinged portion, which is supported by a strut running up to the fuselage and incorporating shock-absorbing devices.

The tail plane is a cantilever monoplane, and the fin and rudder are placed below it, giving an exceptionally free field of fire for the aft gunner. The engine fitted is a Napier "Lion," and the performance of the "Puffin" is very good; but regarding this nothing may be said. The same applies to an experimental machine now coming through the works.

## A. V. ROE AND CO., LTD.

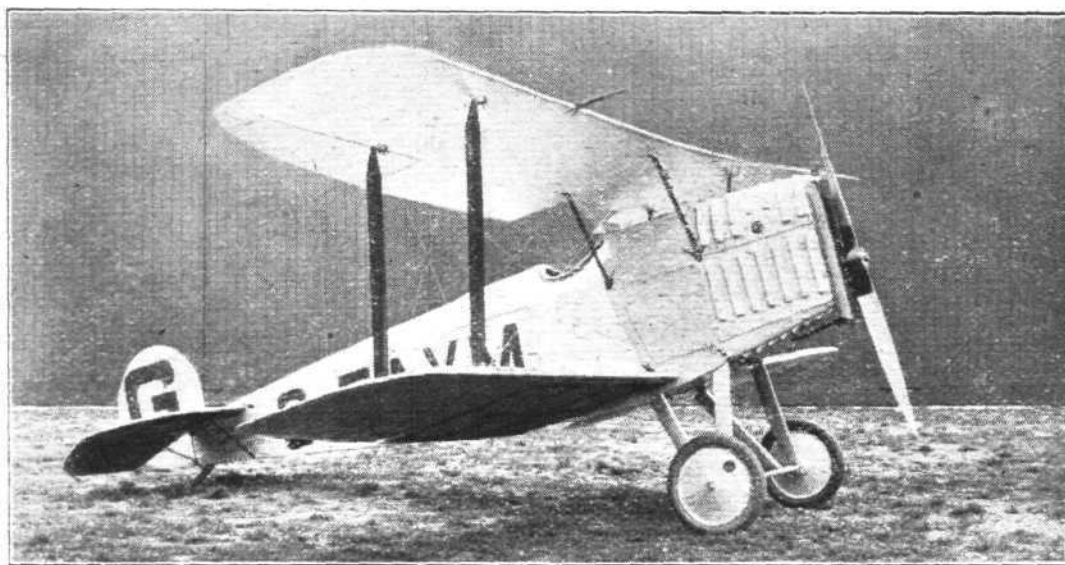
NEWTON HEATH, MANCHESTER AND HAMBLE, SOUTHAMPTON.

THE firm of A. V. Roe and Co. is one of the oldest in the United Kingdom. A. V. Roe himself was one of the first to fly, and is a pioneer of aviation. The work done by this firm during the War is already well known, and it will suffice here to refer to a few only of the recent types produced.

First of all there is the splendid little Avro Baby, which, fitted with a 35 h.p. Green engine, was flown by Mr. Hinkler, from London to Turin without a landing. An even longer non-stop flight was made by Mr. Hinkler in Australia on

has an all-metal engine mounting which renders the engine very accessible, and a slightly larger radiator has been fitted so as to ensure adequate cooling.

Another variation is the Le Rhône-engined Baby, which has gone with the Shackleton-Rowett expedition to the Antarctic. This machine has a special form of wing bracing so as to allow of easy erecting and dismantling without the necessity for truing-up. The Rhône engine was chosen on account of difficulties with water-cooling under antarctic conditions.

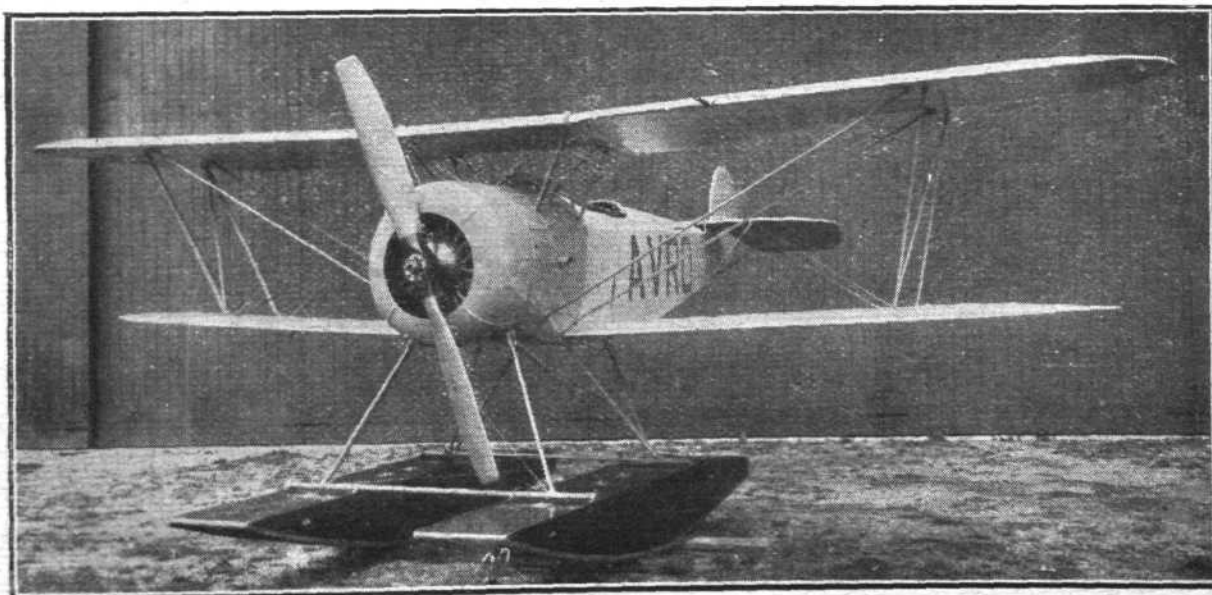


The Avro "Baby," fitted with a 35 h.p. Green engine.

the same type of machine. Since its first introduction, several variations have been produced. For instance, a two-seater with slightly larger wings, but with the same engine, has proved very successful, and, in spite of its low power engine, and consequent low-running costs, has a very good performance. An extremely pretty single-seater has been especially built for flying in India. This machine

Probably the most popular aeroplane ever designed is the Avro 504. Originally designed in 1913 for a Rhône engine of 80 h.p., this machine has gradually had its engine power increased, first to a 110 Le Rhône, then to a 130 Clerget, then to a Wolseley Viper of 180 h.p., and lately an Armstrong-Siddeley radial of 150 h.p. has been fitted.

At the present moment, the works at Hamble are busy on



The Avro "Baby" seaplane, fitted with an 80 h.p. Le Rhône, one of which has been supplied to Sir Ernest Shackleton for his Antarctic expedition.

a contract from Argentina for a number of 504 type seaplanes, fitted with the Wolseley-Viper engine. These machines are similar to that flown by Mr. Tait-Cox in the Aerial Derby, except, of course, that floats are fitted instead of the wheel undercarriage. These machines look very smart, and are, we believe, intended for school work. One of them is being fitted with machine guns, presumably also for training purposes.

A machine about which one would like to write a lot is coming along now, but as it is for the British Air Ministry, no description is permitted. The machine is built chiefly of metal, and has some very unusual features. It was designed by Mr. Roy Chadwick, chief designer of the Avro

firm, to one of the most difficult specifications ever issued by the Air Ministry, and some idea of the task imposed may be formed when it is pointed out that, in order to get the required performance, the structure weight has had to be cut down as low as 50 per cent. of the total weight of the machine fully loaded. The manner in which this has been done is chiefly one of the scrupulous attention to detail, and careful design coupled with the best materials and the highest grade of workmanship throughout. Whether or not the machine attains success for the purpose for which it is designed, judged purely as an aeroplane structure, it is one of which the firm may be justly proud. Our only regret is that we may not describe it at present.

## S. E. SAUNDERS, LTD.

EAST COWES, ISLE OF WIGHT.

THE firm of Saunders has for years been associated with boat-building, especially motor-boats of the high-speed type. This firm has, however, also done a great deal of aircraft work, especially during and after the War. Of special types mention may be made of the large twin-engined flying boat "Valencia," which has two Rolls-Royce "Condor" engines. This machine is the property of the Air Ministry, and no detail information is therefore available.

A machine of highly original design was built for the Air Ministry Competition last year, but, unfortunately, the machine was finished too late to take part in the competition. It was known as the "Kittiwake," and was designed by Mr. Hyde Beadle, assisted by Mr. Gravenell. Among its many unorthodox features was the variable camber gear, which allowed of tilting leading as well as trailing edges by means of a series of worms, resembling in principle the well-

known wirestrainer. Several flights were made with the machine until it came to grief through striking some submerged rocks in the Solent.

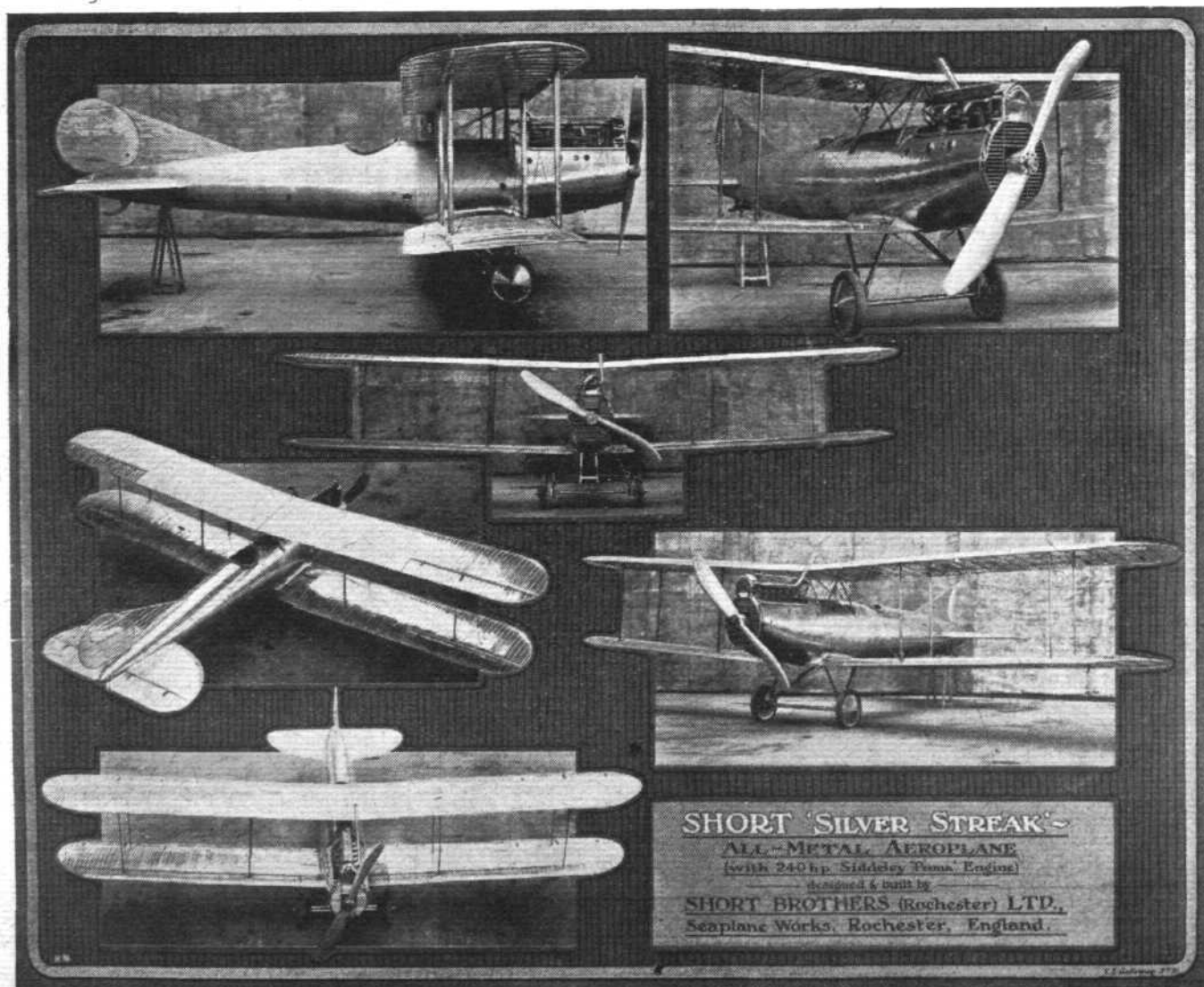
At the present moment the firm is chiefly engaged upon boat-building work, although a certain amount of work is also being done with "Consuta" plywood, of which Mr. Saunders is the inventor. "Consuta" consists of two layers of wood placed with the grain at right angles to one another and joined by cementing as well as by rows of stitching a few inches apart. It is claimed that the stitching binds the wood together even after the glue has deteriorated, and that thus the "Consuta" system is a great improvement over ordinary plywood. It is being used extensively in the Saunders motor boats, and also in the Vickers "Viking" amphibian machines for planking the hull. As it is easily applied it makes for rapid production.

## SHORT BROTHERS (ROCHESTER AND BEDFORD), LTD.

SEAPLANE WORKS, ROCHESTER, KENT.

SHORT BROTHERS were among the very first of British aeroplane and seaplane constructors. From the very earliest

days of flying they have designed and manufactured machines—chiefly seaplanes. In the beginning they had works at



**SHORT "SILVER STREAK"**  
ALL-METAL AEROPLANE  
(with 240hp. Siddeley Puma Engine)  
designed & built by  
**SHORT BROTHERS (Rochester) LTD.**  
Seaplane Works, Rochester, England.



Eastchurch, Isle of Sheppey, where a number of the older types were built. In view of the vogue which folding wings have in modern times, it is of interest to mention that Short Brothers were the first to utilise this feature on their tractor type twin-float seaplanes. Now nearly every machine, except the smallest, shows this feature.

During the War this firm manufactured a very large number of tractor seaplanes, and their designs were manufactured under licence by a number of other firms. Among the purposes for which "Shorts," as they were familiarly called, were employed mention may be made of, apart from the very extensive use for North Sea Patrol, torpedo dropping. Probably Shorts were the first firm successfully to develop this type of machine. That the experiments were discontinued was in no way due to any shortcomings on the part of the machines.

Of recent years the firm has, as a direct result of their extensive experience in airship construction at Bedford, designed machines built entirely of metal. Thus, at the last Aero Show at Olympia, they exhibited an all-metal machine known as the "Silver Streak." This machine was truly "all-metal," inasmuch as both fuselage and wings were covered with Duralumin sheet.

Owing chiefly to a lack of understanding and want of experience in its treatment and application, there has been a certain amount of prejudice as regards the use of Duralumin. Short Brothers, having had occasion to use this metal extensively in their airship works at Bedford, have become familiar with its use and treatment, and feel confident that, properly handled, the metal is quite satisfactory for aeroplane construction.

As regards corrosion, Short Brothers have had a piece of 14-gauge Duralumin suspended in such a position as to be immersed in salt water at each high tide, and exposed to the air at each low tide. This test lasted for nine months, and at the end of that time the only sign of corrosion was furnished by tiny pin-point specks of white, which, when scraped off, did not show any indentation of the metal.

A piece of mild steel, similarly tested, was almost rusted through.

The "Silver Streak" has now been in existence for nearly 18 months, and the metal of which it was built has been in existence and exposed to the air for nearly two years. Yet there is no sign of weakening of any structural member owing to corrosion, although no protective covering of any kind has been employed.

The novel construction of the "Silver Streak" caused a great deal of interest and a certain amount of criticism. That the firm was justified in making the experiment is shown by the tests carried out at the R.A.E., Farnborough. These were of a severe kind, and included vibration tests lasting 100 hours. Although severely overloaded, the machine stood up in a remarkable manner, and no fracture of any kind appeared in the structure. As regards flying, the machine proved very satisfactory indeed.

One of the features which came in for criticism was the use of circular section tubular wing spars of steel. While theoretically not a good section, the tubular spars allowed of a very considerable saving in weight of wing fittings, while making the attachment of ribs, etc., light and simple, as well as making for ease in manufacture.

The ribs, it should be pointed out, are cut from flat sheets, and slotted and flanged with a simple press tool. The covering is in the form of sheet panels, flanged and riveted to the flanges of the ribs. Thus in case of damage to one panel, this can be replaced without interfering with the rest of the wing.

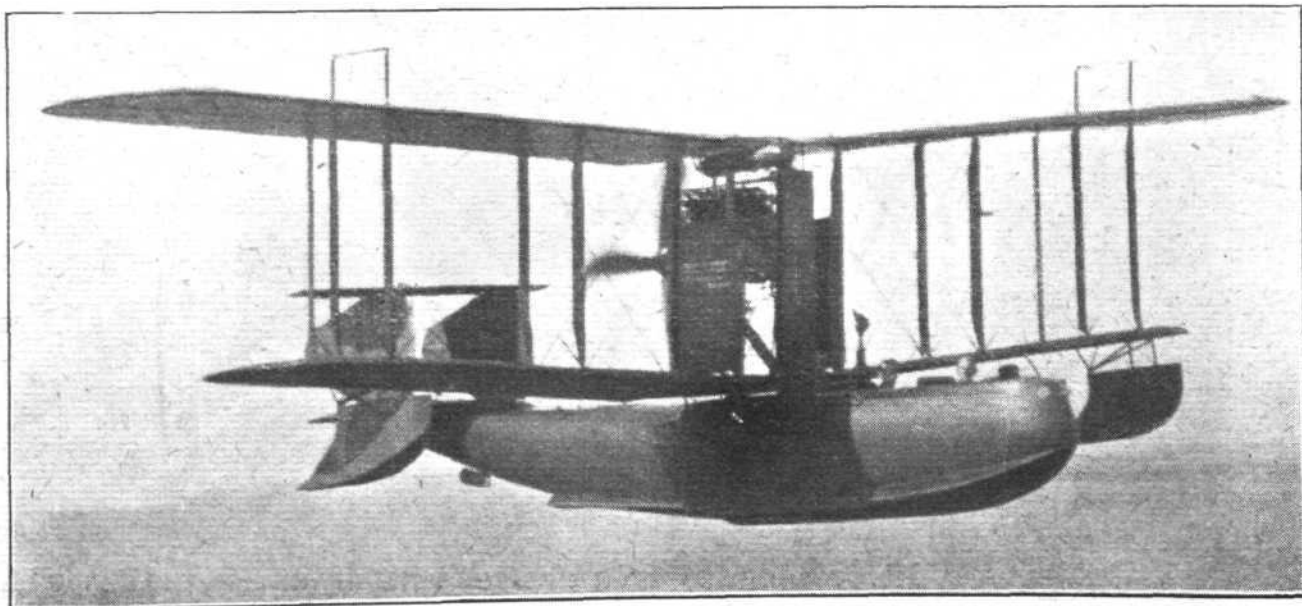
The data relating to the "Silver Streak" are as follows: Engine, Siddeley "Puma" 250 h.p. Area, 370 sq. ft. Span, 37 ft., 6 ins. Length o.a., 26 ft. 5 ins. Height, 10 ft. 6 ins. Petrol tank capacity, 50 gallons. Oil, 6 gallons. Weight empty, 1,865 lbs. Accommodation, pilot and 400 lbs. of freight, or pilot and one passenger. Weight fully loaded, 2,700 lbs. Maximum speed, 120 m.p.h. Cruising speed, 90 m.p.h. Climb, 10,000 ft. in 11 minutes. Range, 360 miles at full power, 450 miles at cruising speed. Load per h.p., 10.5 lbs. Load per sq. ft., 7.5 lbs.

## THE SUPERMARINE AVIATION WORKS, LTD. SOUTHAMPTON.

FROM the foundation of the firm and up to the present time the Supermarine Works at Southampton have specialised on the design of flying boats. Among the best known is probably the "Channel type." Originally this machine was fitted as standard with 160 h.p. Beardmore engines, and even with this low power they carried three passengers in addition to the pilot. In order to get a slightly better performance the more recent boats have been fitted with 240 h.p. Siddeley "Puma" engines, and in this form have proved extremely successful. Among the uses to which they have been put, mention may be made of cross-channel service, aerial surveying in the Orinoco delta, photography around the Pacific Islands and passenger services in Cuba. It is therefore not surprising to learn that a number of these boats is now being built for Japan. Perhaps the most outstanding feature

of all Supermarine boats is their great strength and also their seaworthiness. One of these boats has been deliberately stalled from a height of 30 ft. into the sea without sustaining any damage. This is greatly due to the flexible form of hull adopted. This is of approximately circular section, and the steps are built on to the hull as separate units, thus allowing of repair or renewal of the step without interfering with the main hull.

Recently a new type of amphibian flying boat has been produced, designed for starting from and alighting on the deck of a surface vessel. This is the "Seal" Mark II which was described and illustrated in *FLIGHT* last week. It differs considerably from previous Supermarine boats, chiefly in being a tractor machine. The engine is a Napier "Lion," mounted on a unit structure formed by the upper



The Supermarine "Channel"-type flying boat (160 h.p. Beardmore).



The Supermarine "Seal" Amphibian flying boat (Napier "Lion").

and lower centre sections and the engine struts. It is very accessible, and the radiator is so hung that engine vibrations are not transmitted to it. The pilot is provided with a machine gun projecting through the nose of the boat, while

the rear gunner has his gun mounted on a revolving ring. Just in front of the rear gunner is the cockpit for the wireless operator. The machine is the property of the Air Ministry, and no details may therefore be given.

## VICKERS LTD. AVIATION DEPARTMENT

VICKERS HOUSE, BROADWAY, WESTMINSTER, LONDON, S.W. 1.

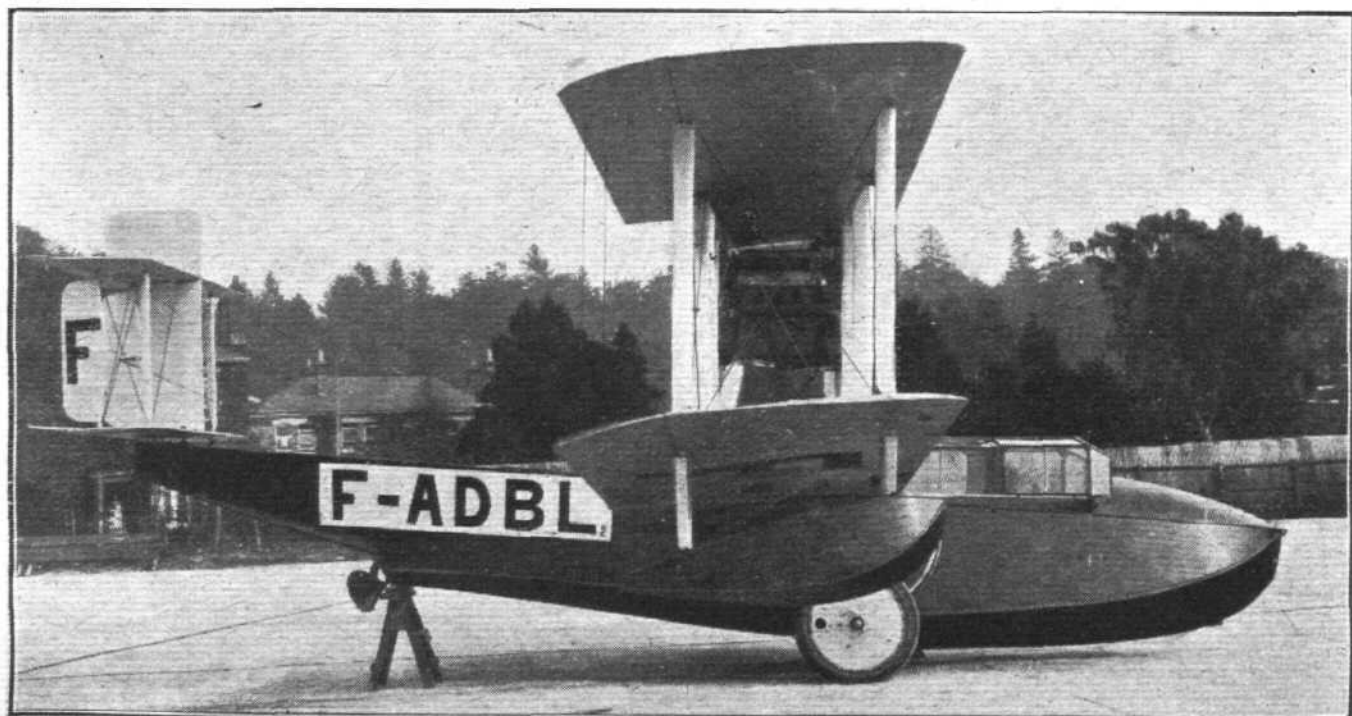
It is quite impossible, in the brief space available in this issue of *FLIGHT*, to do justice to the many activities of a firm like Vickers, Ltd., and we must perforce confine ourselves to a brief reference to some of the more important types of aeroplanes now being built by this firm. In addition to complete machines, Vickers are the manufacturers of a number of highly interesting and successful instruments, petrol pumps and systems, flares and signals for aircraft, etc. These auxiliaries are of such great interest as to require special descriptive articles, and we hope to deal with them in these columns shortly. In the meantime, a brief reference to the various types of aeroplanes and seaplanes bearing the famous name of Vickers should be sufficient to recall the better-known types.

As far as the general public is concerned, the first Vickers machine to make history was the "Vimy-Rolls" on which the late Sir John Alcock and Sir Arthur Brown made the flight across the Atlantic Ocean in 16 hours. Already before

that time, the "Vimy" had done excellent work, but this was not of such a nature as to come before the general public. The "Vimy" was designed by Mr. Pierson, chief designer of Vickers Aviation Department, who has also designed all the Vickers machines produced since the end of the War.

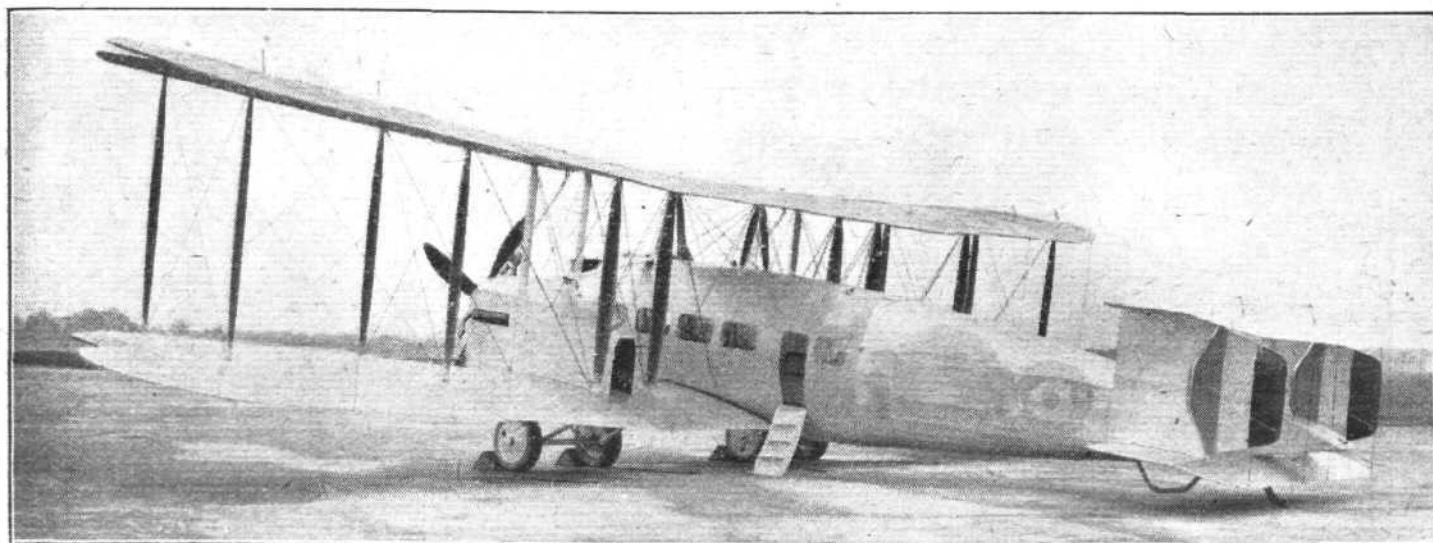
The first commercial machine to be produced was the "Vimy-Commercial" with two Rolls-Royce "Eagle" engines. This machine was similar to the standard Vimy except for the fuselage, which was enlarged to form a commodious cabin seating 10 passengers. This type of machine is well known on the London-Paris airway, where it has been doing excellent work for the Instone Air Line. A number of these machines has also been sold to China.

A somewhat enlarged edition, fitted with two Napier "Lion" engines, has followed the original Vimy-Commercial. Originally designed as an air ambulance, this machine had space for several stretcher cases, as well as for a doctor and nurse. More recently a number is being built for the Air



The Vickers "Viking" Mk. IV Amphibian flying boat (Napier "Lion").





The Vickers "Vimy" transport (two Napier "Lions").

Ministry for the purpose, we believe, of troop transport. These machines are very roomy, and with the higher engine power have an even better performance than that of the older type. The commercial load is over 3,000 lbs., which may be utilised either for passengers or cargo according to requirements. The performance of the Napier-engined machine is as follows, with full commercial load: Full speed near the ground, 115 m.p.h.; full speed at 6,000 ft., 110 m.p.h.; climb to 6,000 ft. in 9 mins.; range at 6,000 ft., and at a cruising speed of 90 m.p.h.,  $4\frac{1}{2}$  hrs., or about 400 miles; landing speed, 50 m.p.h.

For the Air Ministry Competition of 1920, Mr. Pierson designed an amphibian flying-boat known as the "Viking III," with Napier "Lion" engine. Machines of this type had already been tested by Vickers, the earlier types (I and II) having Rolls-Royce engines.

The experiments with the Viking III indicated that for several reasons it would be desirable to increase the beam of the hull. This has consequently been done in the latest type, the "Viking IV," which was fully described in *FLIGHT* of October 6, 1921. This machine has a Napier "Lion" engine, and seating accommodation for five, including the pilot. Machines of this type have been sold to, in addition to the Air Ministry, France, Holland, United States and Japan. They are manufactured for three distinct purposes: (a) Commercial, (b) fleet spotting reconnaissance, and (c) deck-landing. One of the machines sold to France has a coupé

cabin, which can be readily detached if it is desired to use the machine as an ordinary open cockpit type. The whole of the coupé top can be opened during flight if desired. The hull of the Viking is made of "Consuta" plywood, which is strengthened by a stitching of cord in addition to the usual glueing. The two layers of the wood run at right angles to one another, and form an angle of approximately  $45^\circ$  with the line of flight. The land gear consists of two large diameter wheels so mounted that they can be swung forward and upward until clear of the water. In this position they have been found, owing to their position close to the sides of the body, to add but little to the resistance when the machine is flying. The performance of the various types varies slightly. The following figures relate to a commercial type with accommodation for six passengers in addition to the pilot:—Speed near sea level 105 m.p.h.; speed at 6,500 ft. 103 m.p.h. Climb to 6,500 ft.,  $10\frac{3}{4}$  minutes. Range at 6,500 ft. at full speed, 310 miles. Range at 6,500 ft. at a cruising speed of 90 m.p.h., 340 miles. Service ceiling 15,000 ft. Landing speed 48 m.p.h.

Further improvements in the Viking "family" are contemplated, and we hope to see, before long, the establishment of a regular service between London and Paris direct. Capt. P. D. Acland, manager of the aviation department of Vickers, is a man of long vision and great imagination, and, backed by the technical skill of Mr. Pierson and an experienced staff, should achieve still greater success.

## WESTLAND AIRCRAFT WORKS (BRANCH OF PETTERS, LTD.) YEOVIL, SOMERSET.

The aviation branch of the famous firm of Petters, Ltd., of Yeovil, known as the Westland Aircraft Works, came into

being during the War, but as distinct from so many of the new-comers, it has remained after the cessation of hostilities,



The Westland six-seater limousine (Napier "Lion").



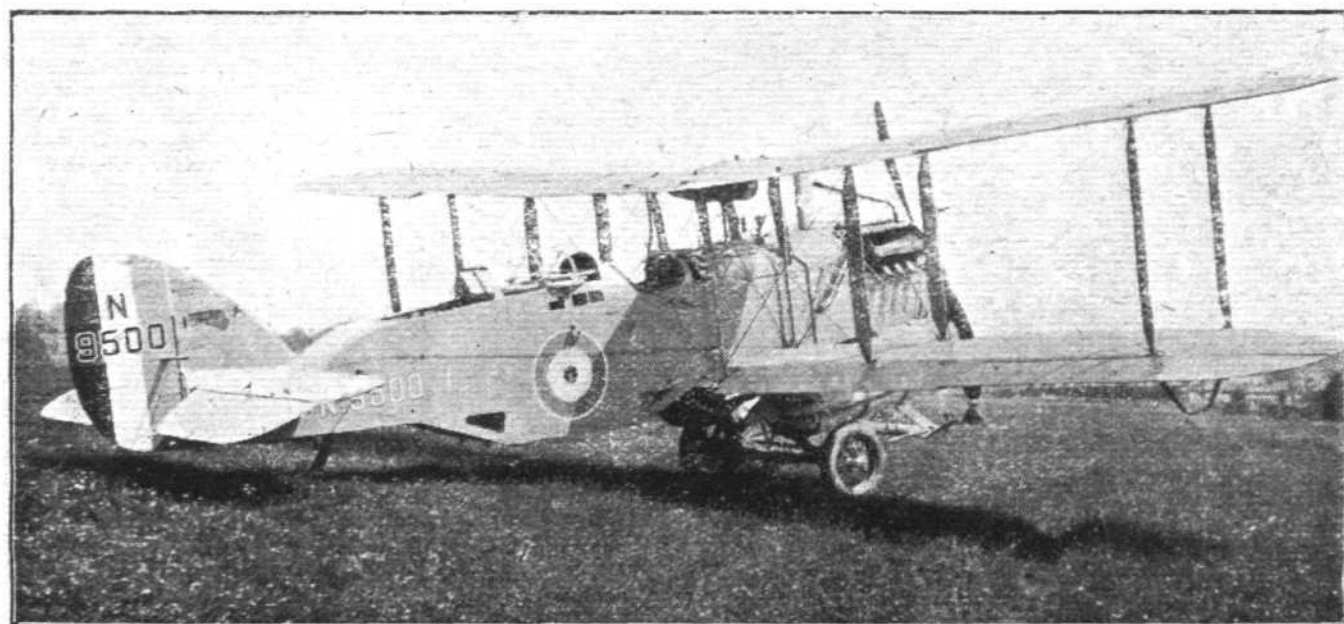
**THE WESTLAND "WALRUS" FLEET SPOTTER :** Three-quarter front view. The photograph shows the machine fitted with the "Grain" type of flotation gear.

and is at the present time engaged on work for the Air Ministry.

The Westland Aircraft Works was one of the first firms to produce a commercial machine after the Armistice. This was a biplane with Rolls-Royce engine, and with a totally enclosed cabin, seating three passengers. The pilot, although occupying a corner of the cabin, sat with his head projecting through the roof. By stooping he could easily converse with the passengers, and this position of the pilot has been retained in all the subsequent Westland types. The first

spotter, with Napier "Lion" engine. The machine is of somewhat unusual appearance. The protruberance under the fuselage is a chamber for the observer, so placed to enable him to lie down and thus being in a position to observe a large area of sea. The wireless operator is placed far aft, almost at the tail, and one does not envy him his position if the machine is rapidly manœuvred such as, for instance, during a fight. The movement so far from the c.g. is very great, and even a simple "switch-back" is very unpleasant.

As the photographs show, the "Walrus" is fitted with



**THE WESTLAND "WALRUS" FLEET SPOTTER :** Three-quarter rear view. The projection under the fuselage is a chamber in which the observer can lie down so as to get an uninterrupted view of a wide area of the sea.

machine was followed by others, one of which was exhibited at the last Paris Aero Show. This also had a Rolls-Royce Falcon engine. At the Olympia Show of 1920 a Westland Mark II, 300 Hispano, was shown. For the Air Ministry Competition of last year, a larger machine, seating five passengers, was produced. This machine, which had a 450 h.p. Napier "Lion" engine, was, it may be remembered, the winner of the competition in the small class. During last summer it was put on the London-Paris service.

Apart from commercial aeroplanes, the Westland works produce various types of machines for the Air Ministry. One of these is shown, for the first time, in the accompanying photographs. This is the "Walrus" deck-landing fleet-

Grain type of flotation gear, consisting of two large bags which can be inflated so as to keep the machine afloat in case of a descent in the sea. For stowage on board ship, the wings are so arranged that they can be unshipped as complete units in a very few minutes. This is effected by having quick-release attachments at the points where the spars join centre-section and fuselage.

The machine has a span of 45 ft. 10 ins. and an overall length of 30 ft. 2 ins. The photographs show the first "Walrus" built. The Westland works are at present engaged upon introducing a number of improvements, but regarding these nothing may be said at the moment, except that they include high-lift wings.

#### Aerial Photographs

COPIES of the aerial photographs, and other photographs which appear in **FLIGHT** from time to time, can be obtained from our official photographers, F. King and Co., Ltd. These

prints, on bromide paper (black and white), measuring 8½ ins. by 6½ ins., cost 2s. 6d. each, post free. Orders, with remittance, should be sent to F. King and Co., Ltd., 36, Great Queen Street, W.C. 2.





# LONDON TERMINAL AERODROME

Monday Evening, November 7, 1921

BAD weather completely dislocated the air services to the Continent for three days last week. On Wednesday, the weather changed suddenly all along the London-Paris route, and caught the machines actually while in flight. All the pilots managed, however, to bring their machines safely to the ground, but many of them had exciting experiences.

Mr. Geysendoffer, flying a Fokker monoplane from Amsterdam to London, was caught by the bad weather after he had passed Lympne and was on his way up to London. He got as near to the aerodrome as Coudon, only a few miles to the south, but found it impossible to proceed any farther. He just missed running into a lunatic asylum, and caught his wing-tip on a tree as he was landing in a field near the asylum.

Mr. MacIntosh, on a Handley Page 0-400, descended at Crowhurst. He could only see a few yards ahead, peering into the rain mist, and, as he himself expressed it, got a "close-up view" of a church clock, but managed to get the machine safely past it. He finally landed in a small field, and the aeroplane had to be lightened of all superfluous weight in order to get it out again on Saturday. Several other machines came down in fields; also at Lympne and St. Inglevert. Those that descended in fields had to remain out in the rain over Thursday and Friday, as the weather was too bad to get them away. This was a good test of the Fokker wooden wing, and I understand that, in spite of the fact that it was out in the open under pouring rain for three days, it showed no sign of any ill-effects.

## Air Cargo Hoisted by Crane

A PARTY of Air Ministry officials travelled to Paris in the W. 8 in the early part of last week, and returned in one of the Instone Air Line's D.H.18's this afternoon. On Tuesday, the Vickers-Vimy "City of London" had a complete Bentley aero engine amongst her cargo, and this had to be hoisted aboard with a crane. It was proposed to carry from Paris on Friday, in this same machine, a small cycle-car, but, owing to the Vimy being weather-bound on that date, this was not attempted. I am told that it would have been necessary to remove one of the propellers in order to get the cycle-car into the machine.

Captain Leverton informs me that there has been quite a rush of goods consigned by air to Amsterdam and Rotterdam. This has to some extent made up for the loss of the newspaper

traffic. Some of this newspaper traffic has, as a matter of fact, now been resumed, and it is hoped that other papers will renew their contracts shortly.

On Saturday morning the machines which had been weather-bound came flying into the aerodrome, and there was quite an imposing array of aeroplanes drawn up outside the Customs. Mr Larry Carter arrived from Brooklands, where he had been compelled to land overnight on his way from Bristol to Croydon with a Bristol monoplane. This machine, fitted with a Le Rhône engine, is being delivered to Spain, and will probably be sent to Portugal later, Mr. Carter left again *en route* for Spain during the morning, and made quite a spectacular take-off.

## British 'Plane for French Air Line

A NAPIER-ENGINEED Vickers-Vimy also arrived from Brooklands on Saturday, with Messrs. Cockerill and Broome in command. This machine is aluminium-doped, and has French registration numbers. It is understood that it has been purchased by the Grands Express for use on the London-Paris service. The machine left for Paris, where it is to be exhibited at the Aero Show, at 12.15 p.m., but had to descend with magneto trouble at Maidstone. It got away again this morning, but landed again at St. Inglevert with engine trouble.

Captain Muir, of the Surrey Services, has now got his school of flying in running order. His first pupil is hard at work mastering the mysteries of rigging and engine fitting. He is Lieut. Dighe, of the State of Indore, India, and he is to spend two years with the Surrey Flying Services, and then return to India to take charge of the State of Indore's flying service.

The Messageries Aériennes had an unusual cargo today. Their machine from Paris to London stopped at St. Inglevert and picked up a cargo of live shells. These were consigned to London by F. N. Pikett et Fils, of Wimereaux—who have been breaking up surplus ammunition in France—and consisted of six 18-pounder and three 4.5 high explosive shells.

Today a D.H.9, painted aluminium colour, has been flashing in the sun above the aerodrome. This, I understand, is the first of four machines which have been purchased from the Disposal Company by a gentleman in Zurich, who intends to use them privately, and also to take up occasional joy-riders and inaugurate an air taxi service in Switzerland.

## THE LONDON-CONTINENTAL SERVICES FLIGHTS BETWEEN OCTOBER 30 AND NOVEMBER 5, INCLUSIVE

Route†	No. of flights*	No. of passengers	No. of flights carrying		No. of journeys completed†	Average flying time	Fastest time made by	Type and (in brackets) Number of each type flying
			Mails	Goods				
Croydon-Paris ...	16	53	5	14	14	2 29	{ D.H.18 G-EAWO (2h. 5m.) } { Spad F-ADAF (2h. 5m.) }	B. (1), D.H.18 (1), G. (3) H.P. (3), Sp. (4), V. (1).
Paris-Croydon ...	17	52	4	15	11	3 31	H.P. G-EAPJ (2h. 46m.) ...	B. (2), D.H.18 (2), G. (4), H.P. (3) Sp. (4), V. (1).
Croydon-Amsterdam ...	3	1	3	3	3	2 58	Fokker H-NABJ (2h. 50m.)	F. (2).
Amsterdam-Croydon ...	5	—	4	4	2	4 39	Fokker H-NABJ (4h. 28m.)	D.H.9 (1), F. (3).
Totals for week ...	51	106	16	36	30			

\* Not including "private" flights.

† Including certain journeys when stops were made *en route*.

‡ Including certain diverted journeys.

Av. = Avro. B. = Breguet. Br. = Bristol. Bt. = B.A.T. D.H.4 = De Havilland 4, D.H.9 (etc.).  
W. = Fokker. Fa. = Farman F.50. G. = Goliath Farman. H.P. = Handley Page. M. = Martinsyde. N. = Nieuport.  
P. = Potez. R. = Rumpler. Sa. = Salmson. Se. = S.E.5. Sp. = Spad. V. = Vickers Vimy. W. = Westland.

The following is a list of firms running services between London and Paris, Brussels, etc., etc.:—Co. des Grandes Expresses Aériennes; Handley Page Transport, Ltd.; Instone Air Line; Koninklijke Luchtvaart Maatschappij; Messageries Aériennes; Syndicat National pour l'Étude des Transports Aériens; Co. Transaérienne.

## Holland and Air Defence

IN the 12-years' scheme of naval defence for the Netherlands and Dutch East Indies, the Dutch Government has laid before Parliament aircraft figures in no mean degree. For the Indies, besides the various cruisers, destroyers, etc., provision is made for 72 reconnaissance 'planes, 18 bombers and 18 battle 'planes. For the Home Naval Air Force 35 reconnaissance and 15 battle 'planes are provided for.

## Ex-King Karl and the Ad Astra Co.

As a sequel to Karl's recent escapade he has, according to a report to hand, had a couple of his motor-cars and about £1,500 standing to his credit in Swiss banks "sequestered" on account of the Ad Astra Aero Co., of Zurich, who were the owners of the aeroplane which the ex-King "commandeered" to carry him to Hungary. A very pretty tit-for-tat.

# THE GALLAUDET MULTIPLE DRIVE

SOME particulars of a high-powered, multiple-engined drive that has just been constructed and tested by the Gallaudet Aircraft Corp. of East Greenwich, R.I., are given in *Aviation* (U.S.A.). It is intended, apparently, for the G.B. (Giant Boat) seaplane now being built at the U.S. Naval Aircraft Factory at Philadelphia. The Gallaudet multiple drive enables a single propeller to be driven by means of a clutch and gear arrangement simultaneously or separately by three engines. The power unit built for the G.B. seaplane consists of three 400 h.p. Liberty engines, and the propeller, an 18 ft. three-blader, is geared to turn at 800 r.p.m.

The G.B. seaplane being fitted with three of these units, or nine Liberty engines, will thus have a total horse-power of 3,600. Its designed maximum speed is 110 m.p.h., and enough fuel is to be carried for a flight of 3,000 miles at cruising speed. The approximate dimensions of the machine are: Span, 150 ft.; overall length, 90 ft.; maximum height, 48 ft. The boat will be 67 ft. in length and 18 ft. in beam, and will be divided into eight water-tight compartments. The framework of the wings will be of steel, while the interplane struts will be of aluminium alloy.

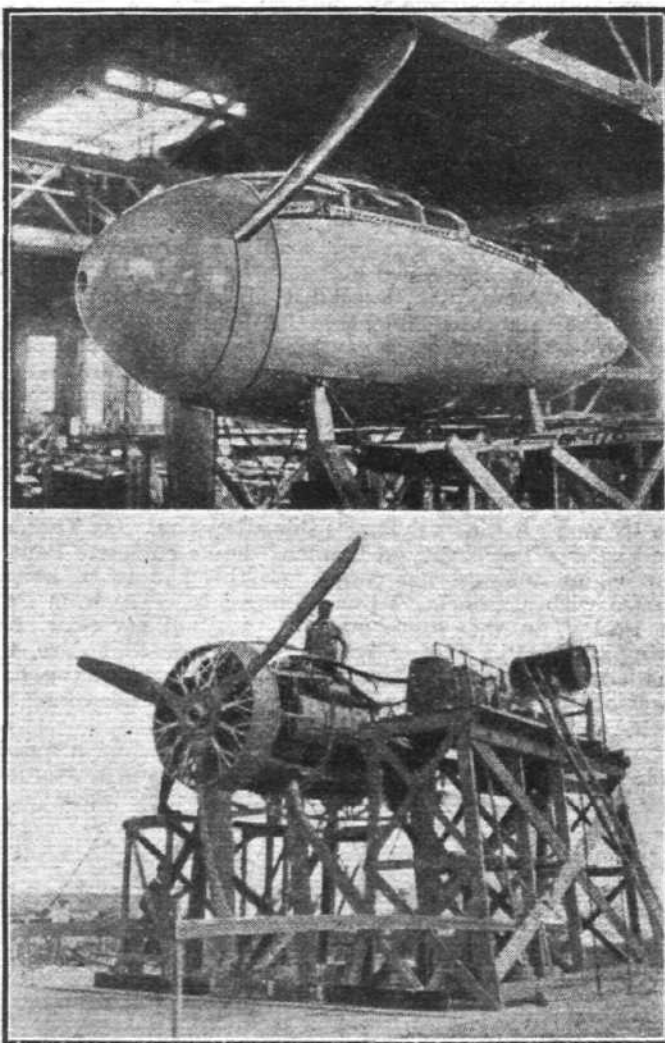
With the Gallaudet multiple drive it is intended to fly the G.B. seaplane on six of the engines (2,400 h.p.), keeping one engine in each power unit always in reserve. The importance of this development is as great from the military as from the commercial viewpoint, for it will tend to do away with forced landings due to engine failure, while on the other hand it will make possible a more efficient utilisation of the power plant. To appreciate this it is sufficient to visualise the head resistance and structural weight of three Liberty engines mounted in separate wing nacelles as against the Gallaudet multiple drive, which unites the three engines in a single streamlined nacelle, and which weighs less than 5 lbs. per h.p., including the propeller.

"The effort of aeronautical engineers," said Mr. Gallaudet, "has been to decrease the cost of operation and increase the speed and maximum range of the aeroplane. Single or isolated engines, attached direct to the propeller, have long been recognised as unsatisfactory in operation and almost impossible to repair during flight. The idea of enclosing three engines in one nacelle has worked out to our complete satisfaction. The gearing down of the speed, and the holding of one engine always in reserve, removes the last obstacle to practical transportation by air over great distances. A 100 ft. all-metal monoplane, with such a power nacelle, we guarantee can make 150 m.p.h. for 20 hours, with twelve passengers aboard. Economy of operation is such that the trans-Atlantic flight or California-Hawaii flight can be made for \$600 to \$700 per passenger. The grouping of engines into power units, and the giving to the pilot or mechanic complete control over his engines for adjustment or repair, means that there is practically no limit to the size of the aeroplane of the near future. In trans-continental flights, divisions will be established, such as are now found on railroads. At each division of 300 or 400 miles aeroplanes will be enabled to change their entire power plant and proceed without transferring the cargo."

The Gallaudet workshops, at East Greenwich, are apparently very busy just now, for in addition to the three power units referred to above, and the conversion of some D.H. 4's, work on several interesting machines is in hand. Metal construction is exclusively employed—wood being used only in the case of the D.H. 4's and for engine bearers. One of the new machines is an all-metal monoplane day bomber, with a span of approximately 76 ft., designed for the 16-cylindere

U.S.A. engine. Another all-metal machine is the P.W. 4 single-seater pursuit biplane—a "hush-hush" machine, embodying several novel features. Designs for a second and larger all-metal monoplane have been accepted by the U.S. Army, while several other competitive designs, prepared by Edson Gallaudet, have been purchased by the U.S. Government.

They are also building some M.K. 4 single pontoon Navy messengers, designed by James V. Martin—an early Hendonian



Two views of the Gallaudet Multiple Drive, which consists of three 400 h.p. Liberty engines. In the lower view it is seen on the 25-ft. testing stand. Its operation with one, two and three engines was successfully demonstrated.

—for the U.S. Navy. This is a very small single-seater, fitted with a Lawrence 3-cylindere air-cooled radial engine, and the first machine has been completed and accepted by the Navy.

## HONOURS

### Order of the British Empire

The King has also given orders for the following appointments to the Order of the British Empire, in recognition of distinguished services in Mesopotamia:—

O.B.E. (Military Division).—Sqdn.-Ldr. C. W. Nutting, D.S.C., R.A.F.; Sqdn.-Ldr. V. O. Rees, R.A.F.

M.B.E. (Military Division).—Pilot Offr. C. W. Booth, R.A.F.; Flying Offr. R. C. Jenkins, M.C., R.A.F.; Flying Offr. A. E. Lindon, R.A.F.

## An Aeroplane next time—perhaps

At Aberdeen, last month, Dr. Deane, Bishop of that city and Orkney was, in order that he might keep in touch with remote parts of his diocese, presented by the laity with a motor-car and frillings, and the wherewithal in "bawbees"

## NOTICES TO AIRMEN

### Aerodromes for Civil Use : Amendments

NOTICE to Airmen No. 81 (Consolidated List of Aerodromes) of October 1, 1921, is amended as follows:—List C: Licensed Civil Aerodromes.—The following should be added:—Alderley Edge, S.S.W. of Chorley Hall; Carmarthen, Pontgarreg, Johnstown; Chesterfield, Caushouse Farm, Ashgate; Haverfordwest Old Racecourse. The following should be deleted:—Bridlington; Llanwrtyd Wells, adjoining Aber Nant Hotel; Sandown, Isle of Wight.

(No. 96 of 1921.)

to cover its running and maintenance expenses for several months. In presenting the car on behalf of the subscribers, regret was expressed that they were unable to give the Reverend Bishop an aeroplane as well to facilitate his visits to the Orkneys and Shetlands.



## THE REID CONTROL INDICATOR

### An Interesting Instrument Manufactured by Vickers, Ltd.

THE Reid Control Indicator is an instrument designed to indicate to the pilot the three essential movements of an aircraft, especially when flying in fog, clouds, or at night—namely, the air speed of the machine; the rate of turn; whether the machine is correctly banked for its rate of turn or direction of sideslip.

The instrument shows the necessary control movement required by the pilot to regain control in fog, etc., and to maintain a straight course. The strain to a pilot of watching a pointer has been overcome by using small electric lamps, easily visible and mounted around the Air Speed Indicator. The top row of lamps is controlled by a mercury device, and the bottom row by a gyro, the two rows being synchronised. The lights are designed to operate in accordance with the position of the machine, and every movement is indicated.

Thus, if the machine is turning to the right the lights indicate outwards to the right on the bottom row, and if side-slipping to the right the lights on the top row indicate to the right and outwards.

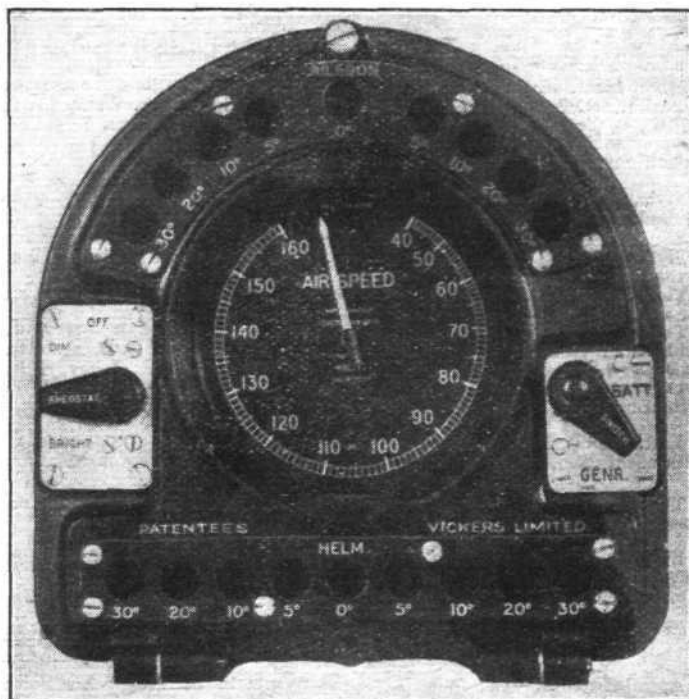
The port or left-hand lights are coloured red, while the starboard or right-hand lights are coloured green. The centre lights on each row are coloured white. To maintain a straight course the pilot keeps the two white lights constant. The instrument is very sensitive, and correct, and has a very efficient adjustment for steadying in rough weather.

Controls are fitted for completely putting the instrument out of action when not required, and also for adjusting the brilliancy of the lamps.

The face of the Indicator is hinged, and can be easily opened in the air for inspection or replacing bulbs in case of failure. Spare bulbs are carried inside the instrument.

Practical tests have been carried out for over 18 months under severe conditions, and the instrument has fulfilled every demand made of it, proving that there is now a light, compact and durable instrument which has made aerial navigation simple, accurate, and free from excessive strain on the pilot.

The complete instruments weighs 12 lbs. approximately, and is very neat, compact, and water-tight.



**THE REID CONTROL INDICATOR :** This instrument which is manufactured by Vickers, Ltd., is claimed to make it relatively easy for a pilot to fly in the dark or in a fog, as it indicates exactly what the aeroplane is doing.

## MACREADY'S ALTITUDE RECORD

LIEUT. JOHN A. MACREADY, Chief of the U.S. Flying Section, McCook Field, who on September 28 last attained a recorded altitude of 41,200 ft. in a Lepère biplane, gives a detailed account of this remarkable altitude flight in the *New York World*, from which we quote below some of the more interesting points.

It should be noted that the 41,200 ft. recorded by the barographs has been reduced, after correction for instrument error, to 40,800 ft. and this has yet to be corrected for air temperature difference. Lieut. MacReady, in his opening remarks, points out that this flight was in no way a special attempt to beat previous records, but was one solely for the purpose of testing a new airscrew and additional equipment fitted to the Moss supercharger used on Liberty engine installed on the Lepère biplane. The latter had been stripped of all excess weight by cutting out unnecessary equipment, and the petrol capacity had also been reduced. The airscrew fitted was a large slow-speed one, having a ground speed of 1,100 r.p.m.

In addition to the standard oxygen equipment of five flasks containing in all a pressure of 2,300 lbs., an additional emergency flask of 1,500 lbs. pressure, with a lead directly from the flask through a tube into the mouth, was carried. The oxygen was brought into operation when an altitude of 20,000 ft. was reached. "At 10,000 ft.," writes Lieut. MacReady, "I passed through a stratum of clouds and at 20,000 ft. passed through another stratum which somewhat obscured the ground and hindered me in locating any position. . . . I did not feel any ill-effects whatever until well above 30,000 ft., as I was receiving plenty of oxygen and was warm enough; but as the altitude above 30,000 ft. was reached a slight slowing up of one's senses and faculties was noticeable, and this slowing up increased as altitude above this height was gained. If I would stoop over to make some adjustment I would feel the need for oxygen . . . and objects on the ground and the instruments in the cockpit became dim and shaky."

"I was worried at no time until approximately 39,000 ft. was reached. At this altitude ice from my breath within the mask must have clogged the oxygen pipe, for the reason that I felt the force becoming diminished and began to feel very bad effects from its lack. I tried to blow this out . . . but could not act quickly enough to clear

the entire tube, so swung over on to the emergency flask and tore a small plaster from the side of my mask, placing the tube through this aperture directly into my mouth . . . and in an instant was feeling comparatively normal. I was supercharging to sea level condition at 40,800 ft. (indicated), and expected that flying on the engine alone I would probably reach 7,000 or 8,000 ft. more, but this was not the case. As soon as sea level conditions were lost on the engine the power was quickly diminished and I could only get 100 ft. more altitude, which was the absolute ceiling of the plane. While hanging suspended at an indicated altitude on the dial of 41,200 ft. the plane swung and rolled and very little action on the controls could be obtained. The controls were almost useless . . . the machine was at this point practically without control, and I held it there for almost five minutes before I was absolutely certain it would go no further. When assured of this I pulled the throttle slightly back in order to glide down, but even with this small movement the bottom seemed to drop out of the 'plane, and down it quickly went toward earth."

"Before I could make the proper readjustments the engine and radiator had cooled so quickly that there was no warmth from the radiator pipes (utilised for warming the pilot) and it became much colder in the cockpit, resulting in ice forming on the inside of my goggles, making me almost blind for the instant, and I could not handle the 'plane correctly for a short time. I was feeling weak and groggy, and was afraid of passing out completely. My mind was not active and I could not think fast and correctly. . . . I let the 'plane come down almost any way in order to get it down where I could think correctly . . . and at about 30,000 ft. I was beginning to feel normal again. Here I changed goggles and continued my glide toward earth, flying around at 20,000 ft. for a period of approximately 20 minutes, in order that the change in conditions from altitude to the ground would not be too sudden."

Lieut. MacReady's observations of the appearance of the sky at or about the maximum altitude reached are interesting. He could not see any stars, but the atmosphere was extremely bright and light. Instead of being a dark blue the sky was very light in colour, with but a slight tinge of blue. The sun was very much brighter.

# THE ROYAL AIR FORCE

London Gazette, November 1

## Permanent Commissions

Flight Lieut. W. R. Mackenzie, D.S.C., is placed on ret'd. list on account of ill-health, and is granted rank of Maj.; Nov. 2. Sqdn. Ldr. W. D. Long, O.B.E., is seconded for duty with Ministry of Communications, Egyptian Government, for two years; Jan. 1. Wing Comdr. R. G. D. Small is placed on half-pay, Scale A, from Nov. 1 until further notice.

## Stores Branch

Flying Offr. R. J. Sladden, M.B.E., D.C.M., is placed on ret'd. list, and is granted rank of Capt.; Nov. 2.

## Short Service Commissions

Flying Offr. J. D. I. Hardman, D.F.C., is granted a short service commn. in the rank stated, with effect from, and with seny. of, Oct. 18.

The commns. of the following Pilot Offrs. on probation are terminated on cessation of duty:—O. L. Niven, F. M. Dingle; Nov. 2.

The following Pilot Offrs., on probation, are confirmed in rank:—H. A. C. Atkinson, J. N. Boothman, T. W. S. Brown, P. K. Campbell, D. M. N. Coles, A. B. Cree, E. S. Edwardes, B. E. Embry, A. Findley, R. G. R. Godby, H. E. Greenberry, D. R. Loch, A. Maybaum, J. V. Roberts; Sept. 29. G. W. Selby Lowndes; Oct. 4.

## Medical Branch

J. R. Crolus, M.B., is granted a short service commn. as a Flight Lieut., with effect from, and with seny. of, Oct. 19.

## Stores Branch

The commn. of Pilot Offr. on probation F. R. Crookford is terminated on cessation of duty; Oct. 19.

## Seconding

Lieut. R. L. Edward, King's R., is granted a temp. commn. as a Flying Offr. on seconding for four years' duty with the R.A.F.; Oct. 24.

## Flying Branch

The following Lieuts. relinquish their temp. commns., and are permitted to retain their ranks:—E. A. Forbes; Feb. 1, 1919. R. A. Harting; March 3, 1919.

## Administrative Branch

The following Lieuts. relinquish their temp. commns. on ceasing to be employed, and are permitted to retain their ranks:—A. Anderson, C. D. Insall; Oct. 18.

The following Sqdn. Ldrs. relinquish their temp. commns. on return to Army duty:—R. H. C. Routley (Capt., R. Fus.); Oct. 19. H. Ellershaw (Maj., Manch. R.); Oct. 17.

## Technical Branch

Lieut. J. Meadows relinquishes his temp. commn. on ceasing to be employed, and is permitted to retain his rank; Oct. 18.

## Medical Branch

Flight Lieut. A. F. Wright relinquishes his temp. commn. on ceasing to be employed; Oct. 16.

London Gazette, November 4

## Permanent Commissions

Flying Officer G. Y. Tyrrell, M.C., is placed on half-pay, Scale B; Oct. 28.

## Short Service Commissions

Flying Officer B. P. Springett is dismissed the Service by sentence of General Court-Martial; Oct. 26.

## Memorandum

One Cadet is granted an hon. commn. as Sec. Lieut., with effect from date of his demobilisation.

## ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the Royal Air Force are notified:—

**Air Commodore.**—H. R. M. Brooke-Popham, C.B., C.M.G., D.S.O., from Air Ministry (D.G.S.R.) to Headquarters, Inland Area (Supernumerary), for duty as Commandant R.A.F. Staff College (on formation). 14.11.21.

**Wing Commanders.**—R. C. M. Pink, C.B.E., from Coastal Area Aircraft Depot (Coastal Area) to Headquarters, Coastal Area (Supernumerary). 1.11.21. R. G. D. Small, from R.A.F. Depot (Inland Area) to Half-pay List. 1.11.21.

**Squadron Leaders.**—R. E. G. Marix, D.S.O., from Inter-Allied Aeronautical Commission of Control (Germany) to command M.T. Repair Depot (Inland Area). 25.10.21. T. B. Meyer, from R.A.F. Depot (Inland Area) to Headquarters, Inland Area. 6.11.21. P. Babington, M.C., A.F.C., from No. 56 Squadron (Middle East Area) to Egyptian Group Headquarters (Middle East Area), for Air Staff duties. 13.10.21. G. G. A. Williams, from No. 3 Squadron (India) to command No. 56 Squadron (Middle East Area). 10.9.21.

**Flight Lieutenants.**—P. D. Robertson, A.M., from No. 10 Group Headquarters (Coastal Area) to School of Naval Co-operation and Aerial Navigation (Coastal Area). 27.10.21. A. Rowan, from R.A.F. Depot (Inland Area) to School of Naval Co-operation and Aerial Navigation (Coastal Area). 1.11.21. H. J. Down, from General Services Pay Office (Inland Area) to Central Pay Office (Inland Area). 15.11.21. E. R. Bastard, from No. 5 Flying Training School (Inland Area) to Inland Area Aircraft Depot (Inland Area). 4.11.21. B. E. Harrison, A.F.C., from No. 1 Flying Training School (Inland Area) to R.A.F. Base Leuchars (205 Squadron) (Coastal Area). 1.11.21. (Note.—Appointment to R.A.F. Depot from 24.10.21 is cancelled.) S. Nixon, O.B.E., from Air Ministry (C.G.C.A.) to R.A.F. Airship Base (Coastal Area) (Supernumerary), to be attached to Pulham Airship Station. 1.11.21. L. F. P. Bawn, from No. 24 Squadron (Inland Area) to No. 1 Group Headquarters (Inland Area). 1.11.21. H. H. James, from R.A.F. Depot (Inland Area) to No. 1 School of Technical Training (Boys) (Halton). 11.11.21. E. Drudge, M.B.E., from School of Photography (Inland Area) to Instrument Design Establishment (Inland Area). 10.11.21. E. A. Lumley, M.C., M.B., from Headquarters, Middle East Area, to No. 47 Squadron (Middle East Area). 8.10.21. W. W. Hart, M.B.E., from No. 2 Wing Headquarters (India) to R.A.F. Depot (Inland Area) (Supernumerary). 2.10.21. M. F. Browne, from Inter-Allied Aeronautical Commission of Control (Germany) to Inland Area Aircraft Depot (Inland Area). 22.10.21.

## IN PARLIAMENT

### Continental Air Post

SIR H. BRITAIN on November 1 asked the Postmaster-General the number of cities on the Continent which are directly connected with London by air post; and what are the possibilities for a further extension of this important service?

Mr. Kellaway: There are direct air mail services between London and Paris and between London and Amsterdam. The service between London and Brussels is at present suspended in consequence of a fire which took place at the Brussels aerodrome at the end of September. The Post Office and the Air Ministry are working together with a view to developing the air post wherever practicable.

SIR H. BRITAIN: Will the right hon. gentleman be good enough to make enquiries as to the possibility of connecting the Paris mail with the regular daily air mail which goes from Paris to Prague and Warsaw, as it would be a great convenience from the point of view of carrying letters to the middle of the Continent?

Mr. Kellaway: Yes, sir. A number of enquiries covering other places besides those mentioned are now being made. I will give particular attention to the point to which he refers.

Lieut.-Col. Nall: Do these services pay their way, or are they a charge on the taxpayer?

Mr. Kellaway: They are no charge on the taxpayers. The use of them made by the public is, I regret to say, very limited, but we get from the public all the charges we have to make.

Lieut.-Col. Nall: Does it involve a loss?

Mr. Kellaway: No.

### Air Mails, Australia

MR. RAPER asked the Postmaster-General whether, and at what rate, he would be willing to guarantee a ton of mail matter per week from London to Australia in the event of a firm, or combination of firms, of sufficient standing and repute being prepared to run a weekly aeroplane service in organised stages from London to Australia, the entire distance to be covered in, say, five days?

**Note on the Comparison of Metals as Aeroplane Structural Materials. (Reports and Memoranda No. 729 (M.3). By A. J. Sutton Pippard.**

IN this R. and M. Dr. Pippard examines the relative merits of two metals, taking account of two only out of the many factors—namely, weight and flexibility. The results which he arrives at are applied, in the last part of the note, to steel and duralumin. The following conclusions

Mr. Kellaway: If a weekly aeroplane service can be established from London to Australia, I shall be prepared to consider the question of employing it for the conveyance of mails. The quantity of mails available, and the price to be paid for their carriage, would depend on the amount of the extra fee which would have to be charged for the service, and on its speed and reliability, which it would, in present conditions, be difficult to determine beforehand.

Mr. Raper: Will the right hon. gentleman be willing to consider the matter and give some sort of approximate idea of the amount of mails he could guarantee?

Mr. Kellaway: I should like to see something like a definite undertaking that it is possible to carry out anything like the service which my hon. friend suggests. If he can give me that information, I shall be glad to consider it sympathetically.

### Airship, United States

MR. GILBERT on November 2 asked the Secretary of State for Air whether it is proposed to offer the American Government another airship for the one that was unfortunately lost; if so, can he state what ship has been offered to them, when it is proposed to deliver the same, and at what air station; if such ship has been accepted by the United States authorities; and can he make any general statement on the subject?

Mr. Parker: The answer to the first part of the question is in the negative, and the remaining parts do not, therefore, arise.

### The Admiralty and Howden

MR. RAPER asked the Parliamentary Secretary to the Admiralty whether his Department were taking over the Howden Air Station, and, if so, what they proposed doing with the same?

MR. EYRES MOUNSELL: Provision has been made in the current Estimates for the erection of a store for gun-mountings at Morecambe. With a view to economy, a proposal to utilise the twin airship shed at Howden for the purpose is under consideration.

are reached: (a) For strut members steel and duralumin give very nearly the same weight for strength ratio; (b) for all beams, whether simple or subjected to axial loads, steel with a proof stress greater than 45 tons per sq. in. allows the construction of a lighter machine than duralumin; (c) steel with a proof stress of 45 tons per sq. in. gives the same flexibility as duralumin. Higher proof stresses will allow more flexibility.



# ROYAL AERONAUTICAL SOCIETY NOTICES



**Next Lecture.**—The next meeting will take place at 5.30 p.m. on Thursday, November 17, when Col. Frank Searle will read a paper on "The Requirements and Difficulties of Air Transport," at the Royal Society of Arts, 18, John Street, Adelphi.

**Change of Programme.**—At his request Capt. de Havilland's paper on "The Design of a Commercial Aeroplane" has been postponed to March 30, 1922. In its place Maj. G. H.

Scott, C.B.E., A.F.C., will read a paper on "The Present State of Airship Development."

**Students' Section.**—Next Students' Discussion Meeting, November 10, at 7 p.m., when a paper on "The Soaring Flight Problem" will be read by Mr. W. L. Le Page. Mr. F. Handley Page, Fellow, has kindly consented to take the Chair.

**Library.**—The following books have been received and placed in the Society's Library: "Hydro-Electric Engineering," edited by Dr. A. H. Gibson; and "Aluminium and its Alloys," by Lieut.-Col. C. Girard.

W. LOCKWOOD MARSH,

Secretary

## CAMBRIDGE UNIVERSITY AERONAUTICAL SOCIETY

(OFFICIAL ORGAN "FLIGHT")

### Annual Report 1920-1921

**Lectures.**—During the year fourteen technical lectures were delivered before the Society, two of which were by members of the Society. The average attendance at these lectures held on each Wednesday during the Michaelmas and Lent Terms was 86. In addition, a Public Meeting was held in November in conjunction with the Air League of the British Empire. The meeting was addressed by Major-General Rt. Hon. J. E. B. Seely, and Lieut.-Col. Moore-Brabazon, who both spoke on "Air Supremacy," there being about twelve hundred persons present.

**Visits.**—There have been five visits organised to:—The Aeroplane Experimental Station, Martlesham Heath; The Royal Aircraft Establishment, Farnborough; Airship Experimental Station, Pulham; The Royal Airship Works, Cardington; Messrs. Napier's Works, Acton. The Committee would take this opportunity of expressing to the Air Ministry and Messrs. Napier and Son, Ltd., their great appreciation of the facilities afforded. An average of 61 members was present on the visits.

**Flying.**—During the Race Week in June the Society organised passenger flying and obtained a licensed field in the Barton Road. Mr. F. J. Ortweiler was the pilot and a large number of passengers was carried on the two three-seater Avros hired for the purpose.

**Inter 'Varsity Air Race.**—As a result of the recommendations of the Air Race Advisory Committee of the Society, it was decided to approach the Royal Aero Club with reference to their assisting in the organisation of an Inter 'Varsity Air Race. For this purpose, the Secretary was present at meetings of the Racing Committee of the Royal Aero Club, and as a result of further negotiations a meeting of the representatives of Oxford, the Royal Aero Club and Cambridge was held in Cambridge in May when it was decided to hold the Race at Hendon on July 16.

Six members of the Society were chosen to go into training at Waddon Aerodrome on July 4, and of these H. A. Francis, Caius; (Captain) R. K. Muir, St. Catharine's, and W. S. Philcox, Caius, were chosen to represent the University.

The Committee desire to express publicly their appreciation

of the very great assistance afforded in this connection by the Royal Aero Club, and especially to Major-General Sir W. Sefton Branker, with whose aid so many initial difficulties were surmounted.

**Membership.**—At the commencement of the year there were 120 Members of the Society. This has now increased to 306, of whom 255 are ordinary Members, 26 Honorary Members, and 25 Life Members. It is sincerely hoped that as many Members as possible will become Life Members of the Society on leaving Cambridge.

**Demonstrations.**—In amplification of his lecture before the Society on "Parachutes," in January, Major Orde Lees gave a demonstration jump from a D.H.9, piloted by Mr. Ortweiler, in the following month before some 6,000 spectators. Following this, Mr. G. I. Taylor, Honorary Member of the Society, also effected a descent.

HERBERT A. METTAM, President

O. E. SIMMONDS, Hon. Secretary

### Lectures, Etc., in 1921-22

Pres. (1921-22)

Sir C. J. QUINTIN BRAND, D.F.C., R.A.F.

Oct. 12. "Aircraft with the Fleet at Sea," Group Capt. Clark Hall, C.M.G., D.S.O.

Oct. 19. General Meeting.

Oct. 26. "High Performance Engines," Alan E. L. Chorlton.

Nov. 2. "The Human Part of the Flying Machine." Prof. B. M. Jones, A.F.C.

Nov. 9. "The Functions of Torpedo Aircraft," Squad.-Leader C. W. H. Pulford, A.F.C., R.A.F.

Nov. 16. "Airships," Major G. H. Scott, C.B.E., A.F.C.

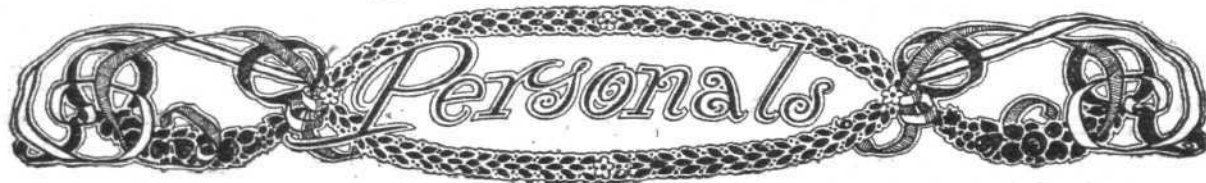
Nov. 23. "Metals in Aircraft Construction," H. Sutton, Esq., M.Sc.

Nov. 30. "The Instruments and Apparatus of Aeronautical Research," Maj. R. V. Southwell.

A visit to be arranged. All meetings commence at 8.30 p.m.

CLIVE O. B. BEALE, Hon. Sec.,

Trinity College, Cambridge



### Married

CECIL L'ESTRANGE MALONE, M.P., late Lieut.-Colonel R.A.F., son of late Rev. Savile L'Estrange Malone, of Dalton Holme, Yorkshire, was recently married to LEAH KAY, M.A., daughter of Mrs. Kay, 52, Argyll Road, Campden Hill.

Capt. DOUGLAS REYNOLDS, M.C., R.A.M.C., second son of Lewis William Reynolds, J.P., and Mrs. Reynolds, of The Priory, High Wycombe, was married on October 26, at Christ Church, Lancaster Gate, to CLARISSA JANET, elder daughter of Mr. and Mrs. MAURICE C. ANDERSON, of 15, Norfolk Square.

LOUIS REYNOLDS, of the Air Ministry, late Major 8th London Regt. and R.A.F., only son of the late Col. E. S. Reynolds, Indian Political Department, and Mrs. Reynolds, was married on November 1, at St. Peter's, Cranley Gardens, to PEGGY, only child of the late J. H. MIDDLETON, D.C.L., Litt.D., etc.,

Director of the Art Museum, South Kensington, and Mrs. MIDDLETON, of 19, Ashburn Place.

Major CECIL HENRY MORGAN, late R.A.F., youngest son of the late Henry Morgan and Mrs. Morgan, of Willesden Green, London, was married on October 29 at St. Luke's Church, Maidenhead, Berks, to MARION SYBIL, youngest daughter of the late Lieut. EARDLEY CULLING CARR, R.N., and Mrs. CARR, of 8, The Crescent, Maidenhead.

### To be Married

An engagement is announced between Lt.-Col. W. LOCKWOOD MARSH, late Royal Air Force, youngest and only surviving son of Mr. and Mrs. H. P. Marsh, of Broom Grove House, Sheffield, and CLARICE MURIEL (DIANA), youngest daughter of the late Rev. W. POWELL-JONES and Mrs. POWELL-JONES, and widow of the late Major Lawrence Jowitt, 5th Highland Light Infantry, who was killed in Gallipoli in 1915.

## Audibility of Oppau Explosion

THE Air Ministry announces that, as a result of the assistance afforded by the Press, letters have been received at the Meteorological Office from 48 persons who heard on Wednesday, September 21st, sounds that they thought might be connected with the Oppau explosion.

The explosion took place at 7.32 a.m. by British summer time. From the known rate of propagation of sound it is easy to show that the sound could not have been heard in England till between 8 and 8.30 a.m. Only four correspondents refer definitely to this time, and there is little to indicate at present that the noises they mention differed in character from others which could not have been due to the explosion. In fact, the question whether the explosion was heard at all in this country remains an open one.

The Director of the Meteorological Office wishes to express his thanks to all who have assisted in this enquiry.

## The Fleet and Air Observers

UPON similar lines to the specialist branches for gunnery, torpedo, navigation and signals, the Admiralty have decided to make a specialist branch of the Air Observers among naval officers. For the present, eight officers will be selected each half-year. In time, only junior lieutenants of two years and upwards will be selected, as in other specialist branches, but a few commanders and lieutenant-commanders are required immediately for training. Courses, each of seven months' duration, will begin in May and November in each year, and will include two months' preliminary training at the naval schools in gunnery and signals, and five months at the seaplane training school at Lee-on-Solent.

While under training with the R.A.F. officers will receive the full pay of their naval rank, with extra remuneration, for each actual day of ascent, of 3s. in the case of commissioned and subordinate officers, and 1s. 6d. in the case of warrant officers. After qualifying they will be eligible for appointment as observers in aircraft carriers in the Royal Navy, and while actually detailed as trained observers will receive allowances of 4s. and 2s. a day respectively. If qualified in wireless telegraphy, these allowances will be increased to 6s. and 3s. a day. Officers will retain their naval rank and wear naval uniform while under training. On completing the qualifying course they will be rated probationary observers and appointed to fleet carriers for further training. On completing six months, including a course at Leuchars, Fife, they will be eligible for confirmation on the recommendation of the Commander-in-Chief of the Atlantic Fleet.

## Avro-Sunbeams in Australia

PARTICULARS are to hand by a recent mail of some performances of Avro commercial biplanes fitted with Sunbeam-Coatalen "Dyak" 100 h.p. engines, which are being produced in considerable quantities in Australia. Up to the time of writing, one machine has carried no less than 283 passengers in 111 flying hours, covering in that time a distance of over 7,400 miles, without mishap.

A similar biplane, the property of Mr. P. Hogarth, Clio, Queensland, made a trip of 1,845 miles in 20 hours' flying time, the average speed being 92.5 m.p.h. The engine gave no trouble throughout the whole of the trip, and the pilot never had a moment's anxiety. This flight was over very sparsely inhabited country, which would, in many parts, be practically impassable by motor-cars, and the value of such expeditious means of transport in such a country can scarcely be over-estimated. The owner of the machine in question, Mr. Hogarth, expresses himself that the aeroplane is the one and only practical means of transport for his district.

## Cairo-Baghdad Air Mails

THE Postmaster-General announces that the air mails for Iraq (Mesopotamia) which were dispatched from London on October 13 and 20 reached Baghdad by air from Cairo on October 30.

In future, dispatches for onward transmission by the fortnightly Cairo-Baghdad air service will be made from London fortnightly on Thursday evenings, instead of weekly as heretofore. Correspondence included in them for Bushire and for all places in Persia north and west of it, as well as for Iraq, should gain from at least 3 days (Bushire) up to 14 or more days (Baghdad, Isfahan, etc.) in time of transmission. A special air fee of 1s. per ounce is charged in addition to ordinary imperial postage. Each packet should bear in the top left-hand corner the "Air Mail" label obtainable at any head or branch post office, and be clearly marked immediately below it "Cairo-Baghdad." Parcels and insured packets are not admitted.

The next Cairo-Baghdad Air Mail will be despatched from London on Thursday evening, November 17.

## PUBLICATIONS RECEIVED

*Technical Note No. 65. Langley Field Wind Tunnel Apparatus.* By D. L. Bacon. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

*Technical Note No. 72. Aneroid Investigations in Germany.* Abstract of paper entitled "Über Aneroid" by E. Warburg and W. Heuse. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

*Report No. 122. Preliminary Experiments to Determine Scale and Slip Stream Effects on a 1/24 size Model of a JN4H Biplane.* National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

## Catalogue

*Napier Aero Engine.* D. Napier and Son, Ltd., 14, New Burlington Street, London, W. 1.

## AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motors. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

### APPLIED FOR IN 1920.

Published November 3, 1921

- 20,488. AGO FLUGZEUGWERKE GES. Aeroplane wing structures. (148,517.)
- 20,489. AGO FLUGZEUGWERKE GES. Lever steering for aeroplanes. (148,518.)
- 20,491. AGO FLUGZEUGWERKE GES. Fighting aeroplanes. (148,520.)
- 21,450. T. H. HILL. Wireless directional apparatus. (169,849.)

Published November 20, 1921.

- 9,665. F. GRUEBLER. Operation of I.C. engines at various altitudes. (141,349.)
- 18,162. V. ENTLER. Aeroplanes. (145,780.)
- 18,484. R. P. PESCARA. Flying-machine propellers. (146,435.)
- 18,703. R. P. PESCARA. Helicopter screw propellers. (146,835.)
- 19,133. P. ST. G. KIRKE AND BRISTOL AEROPLANE CO., LTD. Water-tube boilers, etc. (170,069.)
- 19,293. WERKSTÄTTEN FÜR PRÄZISIONS-MECHANIK UND OPTIK C. BAMBERG. Aerial navigation apparatus. (147,215.)
- 19,595. H. L. COLE. Radiators. (170,077.)
- 20,193. DEUTSCHE FLUGZEUG-WERKE GES. Wooden steering-rudders. (149,666.)
- 20,254. C. LORENZEN. Turbo-compressors for use with aircraft engines. (148,338.)
- 20,305. AGO FLUGZEUGWERKE GES. and G. LETSCH. Triplane. (148,377.)
- 20,428. G. BERRY. Rotary I.C. engines. (148,470.)
- 20,548. M. HEINECKE (née THYRAUER). Parachutes. (148,553.)
- 21,048. LUFTFAHRZEUGBAU SCHUTTE-LANZ. Gas balloon valves. (153,311.)
- 21,050. LUFTFAHRZEUGBAU SCHUTTE-LANZ. Framing for airships. (153,312.)
- 22,304. T. SLINGER. Flying machines. (170,137.)

### APPLIED FOR IN 1921.

Published November 3, 1921

- 8,728. E. S. ULLMANN. Airship mooring apparatus. (169,938.)

Published November 10, 1921.

- 3,696. V. A. ALMONACID. Aeroplane wings. (170,234.)

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